INSIDE: BISON OUTSIDE OF THE PARK

# Montana Outdoors

MONTANA FISH, WILDLIFE & PARKS | $3.50

MARCH–APRIL 2017

## DO NONGAME SPECIES MATTER?

IN THIS ISSUE:

THE GOOD MUSSELS

WHY HAL LOVES THIS TAX

CAN HABITAT MONTANA ENDURE?

HOW HATCHLINGS SURVIVE THEIR BIG JUMP

Montana Fish, Wildlife & Parks

**FIRST PLACE MAGAZINE:** 2005, 2006, 2008, 2011
**SECOND PLACE MAGAZINE:** 2007, 2009, 2012, 2015, 2016
*Awarded by the Association for Conservation Information*

**FIRST PLACE MAGAZINE:** 2012
*Awarded by the National Association of Government Communicators*

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***MONTANA OUTDOORS* MAGAZINE**
**VOLUME 48, NUMBER 2**
For address changes or other subscription information call
**800-678-6668**

*Montana Outdoors* (ISSN 0027-0016) is published bimonthly by Montana Fish, Wildlife & Parks. Subscription rates are $12 for one year, $20 for two years, and $27 for three years. (Please add $3 per year for Canadian subscriptions. All other foreign subscriptions, airmail only, are $48 for one year.) Individual copies and back issues cost $4.50 each (includes postage). Although *Montana Outdoors* is copyrighted, permission to reprint articles is available by writing our office or phoning us at (406) 495-3257. All correspondence should be addressed to: *Montana Outdoors*, Montana Fish, Wildlife & Parks, 930 West Custer Avenue, P.O. Box 200701, Helena, MT 59620-0701. E-mail: **montanaoutdoors@mt.gov**. Website address is **fwp.mt.gov/mtoutdoors**.
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**Postmaster:** Send address changes to *Montana Outdoors*, Montana Fish, Wildlife & Parks, P.O. Box 200701, Helena, MT 59620-0701. Preferred periodicals postage paid at Helena, MT 59601, and additional mailing offices.

FSC MIX Paper FSC® C007548

# Montana Outdoors

MARCH–APRIL 2017

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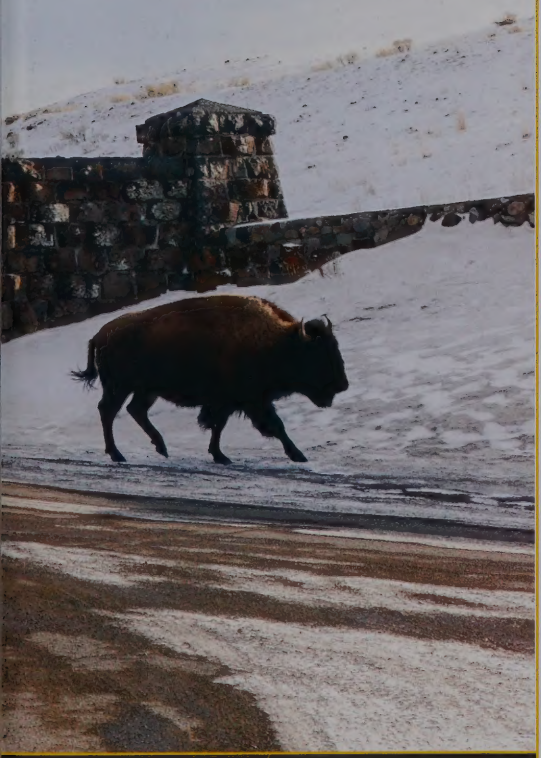


**HEADING OUT**
Bison leave Yellowstone National Park through the Roosevelt Arch near Gardiner. Learn why and where the shaggy beasts can now stay outside the park year round on page 10. Photo by Matt Ludin.

**FRONT COVER**
Still not sure why Montana should care for its 440-plus nongame species? See page 18. Rufous hummingbird by Karl Krieger.

### John Browning's perfect day

I very much enjoyed "The Perfect Day" by Rick Bass (September-October 2016). It brought to mind a similar experience I'd read about by John Moses Browning, the firearm inventor who was also an avid hunter and excellent marksman. In the biography *John M. Browning: American Gunmaker*, Browning relates to the author a story of hunting one evening and seeing an incredible sunset. He noticed a huge grizzly sitting on an outcropping of rock, gazing at the same sunset:

"There was the bear, not over a hundred yards away, sitting straight up, his left side toward me, offering me the choice of any part of his anatomy to shoot at, and I sat with a rifle on my knees just staring, wondering what he was seeing in the west, feeling I had no right to interrupt his devotion with a shot. I'm a gunmaker and as much of a hunter as I've had time to be, and I had a most unusual chance at what is considered the prize big-game trophy of the Rocky Mountains. Yet I just walked away under the influence of the sunset and twilight."

Browning then admitted that he had only one shell, and in the back of his mind was the thought that he might only wound the bear and create a dangerous situation. "But while I watched him he looked solemn and sad, and that's the way I felt. I hope he enjoyed the [many] years they say a grizzly sometimes lives. I never went bear hunting again."

K-Lynn Paul, MD
*Tucson, AZ*

### Those Flemish sure can cook

Thanks for sharing the Venison Carbonnade (Flemish Stew) recipe in the November-December 2016 issue. I made it for dinner with Montana elk steaks, and it was one of the best dishes

(venison or otherwise) I have ever eaten.

Maria Bishop-Carns
*Missoula*

*Tom Dickson replies: I'm not surprised that many readers wrote to say they enjoyed that recipe. After all, it includes bacon, brown sugar, onions, and beer. A tip: If using steaks, braise only for 30 to 45 minutes. If using tough shoulder or neck meat, as in the recipe, cook for the full two hours.*

### A welcome respite

I've just finished looking through your 2017 photo issue as I enjoyed my morning coffee. Your editor's note—on finding common ground in appreciating Montana's outdoors—along with the absolutely amazing photos were the most refreshing things

> "They were the most refreshing things I've come across lately.

I've come across lately. Thank you for the respite and the reminder that beautiful creation surrounds us every day, offering renewal and wonder to those who take time to absorb it.

Naomi Claridge
*Somers*

### What's stopping you?

I love your magazine and Montana. *Montana Outdoors* photos bring so much of the richness and beauty of my "adopted" state (five trips to date and a son-in-law born and raised there), and your articles are so informative. Please accept this meager fan letter from a New Yorker who yearns to live in Montana.

Leslie Faulds
*Warwick, NY*

### Mostly thumbs up for the new cover

I really like your new cover paper on the November-December issue. It feels like velvet or fine leather. I like that there's no distracting light reflection as with the old glossy cover.

Dale Burton
*Billings*

Regarding the recent November-December issue, please get rid of the new cover coating. It feels dirty and gritty. Your magazine has such a good reputation for using high-quality high-gloss paper that makes each image almost more real than life.

Terry Beauchamp
*Dayton, NV*

*Tom Dickson replies: We switched to the new coating because a matte finish seems more appropriate for a magazine featuring natural resources topics. We also like how the lack of glare improves photo clarity and color. A few readers wrote disapproving of the new cover, but they were far outnumbered by those of you who told us you liked the change.*

### Raising the bar

Kudos for the November-December 2016 issue, the best you have ever produced. Great informative and interesting articles.

Robley Carr
*Kalispell*

### Wants a fair shake

I never tire of *Montana Outdoors*. For instance, I liked how FWP responded with the Yellowstone River closure last September, as reported in your "Our Point of View" in the November-December 2016 issue. And I liked "The Price of Popularity" on the Madison River in the May-June 2016 issue, talking about the problem with overcrowding and guiding. I fished the Kootenai River shortly after Libby Dam was built. Great fishing. Then one day some guide boats showed up, and that was the end of the great fishing. It seems to me that we "not so rich" fishermen are taking it on the nose for the commercial interests. Someone needs to put restrictions on more rivers, limiting guides so that the resident fisherman, who pays for most FWP fisheries management, gets what I call a fair shake for his fishing dollar.

Darryl Moss
*Columbia Falls*

### Speak your mind

*We welcome all your comments, questions, and letters to the editor. We edit letters to meet our needs for accuracy, style, and length. Write to us at* Montana Outdoors, *P.O. Box 200701, Helena, MT 59620-0701. Or e-mail us at: tdickson@mt.gov.*

# Mont-Mex Tacos

By Tom Dickson | Preparation time: 10 minutes | Cooking time: 5 minutes | Serves 3–4

SHUTTERSTOCK

I've always loved fish tacos—slices of avocado and crunchy fried chunks of white meat surrounded by coleslaw wrapped in a warm tortilla. But until recently I had never found the right combination of fish and other ingredients. Often there is not enough fish or too much slaw or the spices are off. Then, while visiting an island in the Sea of Cortez in Mexico, my wife and I were served the real deal. They were perfect, and I took notes.

Upon returning to Montana, I went ice fishing for perch at Holter Reservoir so I could make those Baja fish tacos myself. I did a little experimenting, and this is what I came up with. Any white, firm-fleshed fish will work, including sport-caught walleye, pike, or drum or store-bought cod, pollack, or tilapia.

*In Mexico, fish tacos are often made with Tajin Classico seasoning. It's available in the United States online and at some Walmart stores.

*—Tom Dickson is editor of* Montana Outdoors.

*For an archive of Eating the Outdoors recipes, visit the* Montana Outdoors *website at fwp.mt.gov/mtoutdoors, and click on "Recipes."*

## INGREDIENTS

- Vegetable oil, for frying
- 1½ c. thinly sliced red cabbage (about one-quarter of a cabbage)
- ½ c. roughly chopped cilantro
- 1 t. lime juice, plus wedges for serving
- 1 t. honey
- ½ c. mayonnaise
- Salt and pepper
- 6 flour or corn tortillas
- ¾ c. all-purpose flour
- 2 t. McCormick's chipotle chili powder or Tajin Classico* seasoning
- 1 egg, beaten with 1 t. water
- 1¼ lbs. skinless fish fillet, cut into 2- by ½-inch pieces
- 1 ripe avocado
- ½ c. fresh salsa or chopped tomatoes

## DIRECTIONS

Over medium-high heat, start heating ½ inch of vegetable oil in a cast-iron skillet or tall-sided frying pan.

Meanwhile, toss the cabbage, cilantro, lime juice, honey, and mayonnaise in a bowl. Season with salt and pepper.

Warm the tortillas by wrapping in a damp cloth and microwave for 20 seconds. Keep them warm in the cloth.

Mix the flour and chili powder (or Tajin seasoning) in a shallow bowl.

By now the oil should be hot. Dip the fish in the beaten egg and then roll in the flour mixture. Fry in batches until golden and just cooked through, turning once, 2 minutes per side.

Transfer with a slotted spoon to a paper towel–lined plate to drain. Season with salt and pepper.

Halve, pit, and slice the avocado. Fill the tortillas with the fish, avocado, slaw, and salsa (or tomatoes).

Serve with lime wedges. ■

# Inclusive, transparent, fair

As FWP's new director—the 24th over the department's 116-year history—I want to thank outgoing director Jeff Hagener for his commitment to Montana's fish, wildlife, parks, and recreational resources and for handing the baton to me to build from his legacy. I also want to let readers of *Montana Outdoors* know a bit about me and where I envision FWP going during the next four years.

I worked as an attorney for this department from 1998 to 2011, helping FWP fight for wolf delisting, protect stream access, and conserve habitat. During my 13 years here, I also learned the importance of securing access to public lands, how private property provides essential wildlife habitat, and how climate change threatens our valuable trout fisheries. After leaving FWP, I went to the Department of the Interior to work on parks, conservation, river, and wildlife issues. I then returned to Montana to teach natural resources and wildlife law at the University of Montana.

I hunt, fish, and enjoy camping and hiking in Montana's wonderfully diverse state parks, among other outdoor activities.

A reasonable question by anyone who cares about FWP is whether I plan to continue the course set by Jeff during his 12 years as director. I do. I'm committed to our fish, wildlife, parks, and recreational resources and heritage. I'll continue Jeff's work to strengthen department relations with stockgrowers, farmers, and other landowners; delist the grizzly bear; open more public lands to hunting and other recreation; strengthen the financial health of our state parks system; and broaden our fish and wildlife funding base while serving a more diverse group of outdoor recreationists.

Right away my top priority will be to unify the agency around the FWP vision document.

That 22-page document was created over the past two years by FWP staff who drew upon ideas, concerns, and suggestions from employees and the public across the state. It sets a course for this agency over the next decade and makes clear FWP's core values, such as embracing the public trust, respecting property rights, and using science. The vision document also commits the department to improving public service, accomplishing more through partnerships, and increasing opportunities for outdoor recreation, to name just a few goals.

In this fast-changing world, we as an agency need to adapt and adjust to remain relevant. Hunters and anglers continue to ask for more and better information, access, and opportunities. Public interest in nongame wildlife management and wildlife watching recreation continues to grow. Visits to state parks have doubled in the last few years, while revenue to manage and maintain those treasured sites has flatlined. Rapidly developing technologies such as smartphone apps create new opportunities for serving our various publics. And that's just for starters.

In responding to these and other challenges outlined in the FWP vision document, this department needs unity to become stronger, more responsive, and more creative. We also need to work more collaboratively with communities, businesses, interest groups, and other agencies. And all the while we must be inclusive, transparent, and fair.

THOM BRIDGE

The world we live in has never been so interconnected. Consider the recent discovery of invasive mussels in Montana. The invasive species threatens agriculture and fishing industries, outdoor recreation, and aquatic ecosystems. Responding to the threat has required all concerned parties to come together and agree on appropriate responses for containment and control. Despite FWP's proven expertise in managing aquatic invasive species, this is not an issue we can tackle alone. That's also true with so many issues we face.

As FWP's new director, I'll try some new approaches to solving problems, but I'll be sure that the department's long-held priorities and values stay the same. I've been with FWP before and have worked for years on the issues challenging the agency. I'm surrounded by smart and capable men and women from all divisions of the department. With their advice and support, I'll do everything in my power to ensure that FWP continues to manage the state's fish, wildlife, and parks responsibly and sustainably so that they remain central to the Montana experience we all value.

—**Martha Williams**, Director, Montana Fish, Wildlife & Parks

***To view the FWP vision document online, Google "FWP Vision and Guide."***

MONTANA FWP

# LOON LAUNCHER

**CHRIS HAMMOND**
Nongame Wildlife Biologist, Kalispell

**This loon had been rescued** from a parking lot in the Bitterroot Valley during the winter after a heavy rain. Sometimes diving birds mistake a flooded lot for a lake. Most can just fly away, but loons can't get airborne again because the water is too shallow. Two colleagues and I decided to release it at Big Arm State Park on Flathead Lake, which was about the only open water in western Montana we could find. We checked the bird for injuries (it was unharmed), banded it, and then made the release. By banding loons, we gain a lot of information on survival rates, age, and territorial "fidelity"—which means the extent to which they return to the same nesting areas on northern lakes each year. In the case of loons, fidelity is very high. We had one return to the same Montana lake 18 summers in a row from the same wintering habitat in central California. Banding has also helped us learn that loons are extremely long lived. One female that was banded on Placid Lake is at least 26 years old. When she was 22, we found that she was breeding with a 6-year-old male. I think it's great that people started calling her "the cougar."

One morning while hiking along cliffs above the Missouri River north of Winifred, Helena photographer **STEVE McMORRAN** looked down and saw a bird circling below. He identified it as a peregrine falcon by the gray-blue plumage and black "mustache" or "sideburns." "You don't get above raptors very often, especially peregrines, so I was lucky to have my camera with me," he says. McMorran sometimes climbs into tall trees to get similar shots of other bird species from a high vantage point. "I admit I've fallen out of a tree or two," he says. "But one way to get good photographs is to put yourself in a good spot and start firing away."

Average number of miles, in thousands, driven by **35** each Montana FWP game warden every year.

One of 28 species in Montana

## 2016: hottest year ever

If you felt the heat last summer, you weren't alone. The National Center for Atmospheric Research in Boulder, Colorado, reported earlier this year that 2016 was by far Earth's hottest year on record, breaking the previous record set in 2015. In the contiguous United States, 2016 was the second-warmest on record.

Among the hottest spots worldwide: central Russia and Canada's Yukon. In the United States, Alaska, Oregon, Idaho, and northwestern Montana were especially warm.

One result in Montana was extremely low spring mountain snowpack. Coupled with high summer temperatures, the sparse runoff led to weak stream flows and warm water. The extreme conditions forced FWP to close many streams and rivers to angling to protect trout.

Warm water contributed to the death of thousands of mountain whitefish on the upper Yellowstone in late summer, forcing the closure of that blue-ribbon river for several weeks. ■

A dead Yellowstone River whitefish

POLLINATORS

## Now the "Bee State?"

Montana is famous for its wildlife diversity, from pronghorn to pine martens. Now add more than two dozen bee species to the list.

Researchers at Montana State University have discovered that Montana is home to 28 bumblebee species, more than any other state. Earlier this year, the scientists published their findings, including the state's first inventory of bumblebees, in the *Annals of the Entomological Society of America*, the nation's top entomology journal.

Nationally, bumblebees are in puzzling decline, a loss of critical pollinators that threatens the world's food supply. "The first step toward protecting bees is to understand their species numbers so we can build on monitoring efforts," says co-author and research scientist Casey Delphia.

Why so many bee species in Montana? Delphia says it's due to the state's size and landscape diversity, from mountains to prairies.

To tally bee species, researchers counted existing specimens in MSU's Montana Entomology Collection and other museums. They also enlisted university faculty, staff, students, and alumni statewide to collect and contribute specimens from varying elevations and diverse ecosystems. ■

FOOD

## How nature produces tons of venison

Each year, Montana's elk, deer, and pronghorn yield several tons of wild game meat worth tens of millions of dollars. "We have a wild meat economy here in Montana that most people don't even realize exists," says Thomas Baumeister, chief of the FWP Conservation and Education Division's Conservation Education Bureau.

Baumeister recently tabulated Montana's wild game production by multiplying the average weight of meat produced per animal by the average hunter harvest from 2012 to 2014. The final tally: 9.3 million pounds of venison per year.

"Meat certainly isn't the only motivation for hunting, but we're recognizing that more and more people are taking up hunting for the meat," Baumeister says. So-called locavores and others are attracted to wild protein that is free-range, humanely raised, and environmentally benign. "The meat you get from an elk or deer might not be certified organic, but it definitely has all the components of organic meat," he says.

In Montana, elk produce the most wild meat (4.6 million pounds), followed by white-tailed deer (2.3 million pounds), mule deer (2.1 million pounds), and antelope (350,000 pounds). "That production happens year after year thanks to healthy habitat, conservation-minded landowners, and sound wildlife management," says Baumeister.

If compared to beef, ranging from $3 a pound for regular store-bought beef to $6.50 per pound for organic, grass-fed beef, those 9.3 million pounds of venison are worth $30 to $60 million.

For a hunter who harvests a buck that produces 60 pounds of boneless venison, that's anywhere from $180 to $400 worth of prime meat.

"The economic value of the meat itself is another reason why people hunt, and it's something to feel good about," Baumeister says. ■

Valuable venison

INVASIVE SPECIES

# Montana responds quickly to invasive mussel discovery on several lakes and rivers

Last October, FWP crews conducting routine sampling of waterbodies in the upper Missouri River Basin made troubling discoveries. Invasive mussel larvae, known as veligers, were detected in Tiber Reservoir, near Shelby, and Canyon Ferry Reservoir, near Helena. These were the first discoveries of invasive mussels in Montana. Suspect samples of invasive mussel larvae were later detected in the Milk River near Malta and the Missouri River near Townsend.

Invasive mussel veligers

"It's a huge concern," says Eileen Ryce, FWP Fisheries Division administrator. "Our priority from day one has been containment and control."

The thumbnail-sized mollusks are native to Asia and have spread west across Europe and North America. Once established, the invasive mussels rapidly reproduce, clogging power plants, irrigation pipes, boat engines, and municipal water systems as well as damaging aquatic ecosystems.

Governor Steve Bullock declared a statewide natural resource emergency and formed an incident command team charged with containing and controlling the spread of invasive mussels.

The Montana Mussel Incident Response Team, comprising FWP, Montana Department of Natural Resources, and other agency staff, immediately restricted boating on Tiber and Canyon Ferry Reservoirs to prevent any mussels from spreading. The team also convened a panel of aquatic invasive species (AIS) experts from across Montana and the United States. Crews dispatched to sample waterbodies throughout the state sent samples to labs in Montana, Colorado, and California.

In late December, the response team reported no new detections of invasive mussels in the 182 lakes and rivers sampled. "Though we are all concerned that invasive mussels have made their way into Montana, that was some welcome news," Ryce says.

The team has presented recommendations to Montana legislators for responding to the invasive mussels, including setting up decontamination stations at infested waterbodies, doubling the number of FWP watercraft inspection stations (from 17 to 34), and increasing water monitoring.

For the past decade, FWP has monitored waters, inspected watercraft, and asked owners to inspect and clean their boats to prevent the spread of invasive species. "We have a great AIS team in place to respond to these new developments based on sound science and proven management practices," says Ryce. "Montanans and visitors also have a role in helping reduce the risk to the state's economy and aquatic resources."

Ryce urges all boaters and anglers to get into the habit of practicing Montana's "Clean, Drain, Dry" protocol: Clean your boat and equipment every time you use it; drain all standing water, including any left in the engine's cooling system, livewells, and bilge areas; and then dry everything that has come into contact with water. ■

Right: An FWP aquatic invasive species check station. Below: Invasive mussels covering submerged fishing gear.

CLOCKWISE FROM TOP LEFT: CARTOON ILLUSTRATION BY MIKE MORAN; DAVID R. ARMER; DENNIS P. MOLLOY/NYT VIDEO; JESSE WARNADO; MONTANA PUBLIC RADIO; KANSAS WILDLIFE, PARKS & TOURISM; SHUTTERSTOCK; HUNTER D'ANTUONO

# Nation's best at hooking kids on fishing

FWP's Hooked on Fishing Program for elementary students recently won a national education award from the American Fisheries Society.

Hooked on Fishing provides monthly classroom instruction on Montana's aquatic resources and fishing for fourth-, fifth-, and sixth-grade students.

Classroom and field components include lessons on aquatic invasive species, native fish, fishing regulations, ethics, identification, anatomy, water cycles, and other topics. All lessons are correlated to state teaching standards in math, science, and other fields.

Hagengruber hooking sixth-graders

During the current academic year, the program is in 224 classrooms, reaching 5,400 students across Montana. More than 70,000 students have participated in the program since it began in 1996.

The American Fisheries Society's 2016 Aquatic Education Outstanding Sport Fish Restoration Project of the Year Award was presented to FWP Angler Education Program coordinator Dave Hagengruber in December. Hagengruber says the award "is really a tribute to the hundreds of teachers and volunteers who have made this program so successful over the past 20 years." ■

# Breathing Room

After decades, bison are finally allowed to roam year round outside of Yellowstone National Park.

BY ANDREA JONES

**THE GREAT ESCAPE** Bison amble past the western boundary of Yellowstone National Park. In 2015, Governor Steve Bullock called for expanding tolerance for bison in a limited area outside the park's west perimeter, including Horse Butte and the Taylor Fork drainage.

PHOTO BY DAWN Y. WILSON

On a sunny, cloudless day in June 2016, the sidewalks of West Yellowstone are packed with tourists. A line of cars and SUVs stretches for more than a mile from Yellowstone National Park's western entrance back through the small town.

Most of the visitors inching along the road hope they will soon see wildlife—bears, moose, or, most exciting for many, bison. They don't realize that, just a few miles north, *outside* of the park, dozens of the brown, shaggy brutes are bedded down in lodgepole pines on either side of the road. Dozens more lounge in family groups on grassy Horse Butte, a peninsula jutting into Hegben Lake just a few miles west.

That bison now range outside the park in late spring is a remarkable conservation milestone. A decision by Montana Governor Steve Bullock in early 2016 allowed hundreds of the large mammals to live beyond the park's western boundaries year round for the first time in decades. The decision broke a longstanding impasse between wildlife advocates who want to see bison roam outside Yellowstone and livestock interests concerned the animals will spread disease to cattle.

To fully appreciate the significance of free-ranging bison here requires understanding the long and complex relationships linking the large animals, the nation's first national park, the people who visit Yellowstone, and those living and ranching near its borders.

**From countless to controversial**

Bison once covered the North American plains from Canada to Mexico in numbers ranging from 30 to 60 million. Also known as buffalo, the 1,000- to 2,000-pound grazers were vital to Native American tribes. "Bison were at the very heart of our traditional way of life," says Tom McDonald, director of the Confederated Salish and Kootenai Tribes' Fish, Wildlife, Recreation, and Conservation Program. "They provided clothing, shelter, food, and tools, and were central to our spirituality."

But market hunting and U.S. Army efforts to weaken Indian resistance in the late 1800s wiped out herds to a point of near extinction. Bison numbers plummeted to fewer than 1,000 by the turn of the 20th century. Only 30 remained in Yellowstone National Park.

America's budding conservation movement galvanized around the plight of the animal, which was seen as an icon of the wild American West. Groups like the recently formed Boone and Crockett Club and American Bison Society pressured Congress to protect herds in the newly established Yellowstone National Park and other public wildlife refuges. The Lacey Act of 1900 put teeth into the fight against poaching and charged the Army with guarding the small group of surviving Yellowstone bison.

No one knew how to manage the wild ungulates, so early efforts mimicked livestock practices. Calves were bottle fed, and the animals were given hay in winter and kept in corrals. Managers also added to the tiny Yellowstone population, such as by moving 18 cow bison from the Pablo-Allard herd north of Missoula to the park.

Lacking natural predators and protected from hunting, Yellowstone's bison population quickly increased by the hundreds. Then, in 1917, came the first discovery of brucellosis in the herd. The bison likely contracted the disease, which can cause both cows and bison to abort their fetuses, by mixing with cattle. This discovery set the stage for nearly a century of intense conflict and negotiation over bison management, often pitting federal and state livestock, wildlife, and park agencies against one another.

Starting in 1967, park officials began a policy of "natural regulation," which allowed bison to migrate out of the park in winter when deep snows covered grass in the high-elevation park. By the 1980s, bison were regularly crossing park boundaries to lower-elevation areas around Gardiner, at Yellowstone's northwestern entrance, and West Yellowstone.

Another factor driving the animals out of the park was population size. "Bison didn't want to leave Yellowstone until their numbers hit 2,000 and grew too large for the park to sustain," says Pat Povah, who owns a cattle ranch near West Yellowstone.

By the 1990s, with brucellosis essentially eradicated in cattle, the U.S. Department of Agriculture designated livestock in all but a

**BISON HUSBANDRY** At first, park managers treated bison like livestock, feeding the animals and keeping them corralled. Starting in 1967, a new policy allowed wider movement within and outside of Yellowstone, befitting the bison's wild nature.

*Andrea Jones is the Regional Information and Education Program manager in Bozeman.*

**COMMUTER TRAFFIC** Bison cross the Gardner River bridge north of Mammoth Hot Springs. The park is now home to 5,600 of the animals, well beyond the target population of 3,000. In winter, many bison move to lower elevations outside the park, putting them in conflict with cattle operations.

few states "brucellosis free." Yet elk and bison that carried the disease—more than half of Yellowstone's bison population tested positive—conceivably could still infect nearby cattle. Ranchers maintained that bison posed a great risk to livestock in the so-called Designated Surveillance Area around the park. "Concerns over the spread of this disease have required testing of cattle before sale or transport out of the surveillance area," says Marty Zaluski, state veterinarian with the Montana Department of Livestock.

### Two often-conflicting goals

Concerned about the risk of brucellosis transmission, Montana sued the park in the 1990s to keep bison out of the state. A court-mediated settlement reached in 2000, called the Interagency Bison Management Plan (IBMP), created a blueprint for managing the animals. The park, seven Montana and federal agencies, and several Indian tribes now carry out the plan, which has two ambitious, though often-conflicting, goals: 1) maintain a wild, free-ranging (including outside the park boundaries) population of bison, and 2) reduce the risk of brucellosis transmission to nearby cattle to maintain Montana's brucellosis-free status.

To reduce the chances of disease transmission, the plan establishes tolerance zones in Montana where bison and cattle are separated by fencing or distance. The plan also sets a target population of 3,000 bison in the park to prevent overcrowding and habitat degradation.

To rein in the range and population of the Yellowstone herd, which some years grows to more than 5,000, agencies working under the plan have hazed the animals back into the park using horseback riders, four-wheelers, and, in special cases, helicopters. Managers also use regulated hunting by the public and tribal members, and they cull the herd by sending bison to slaughter and donating the meat to Indian tribes.

The plan has its detractors. Bison advocates such as the Buffalo Field Campaign and some Indian tribes denounce hazing and culling, arguing that the practices unnecessarily harass and kill bison. And some ranchers still contend that the plan doesn't do enough to protect their property from bison damage or their livestock from disease.

Still, no brucellosis transmission from bison to cattle has occurred since the plan was adopted. That means one IBMP goal is being reached. Yet the other—allowing some bison to range free outside the park—has remained elusive until recently.

### Tolerance to the north and west

Several years after the bison plan was first put in place, the multidisciplinary team that wrote it started looking more critically at hazing and culling. Though both practices keep cattle safe, the work is expensive and casts the entire bison management opera-

**BACK YOU GO** Specially trained park and state staff use horses, four-wheelers, snowmobiles, and occasionally helicopters to haze bison leaving Yellowstone back to within park boundaries. Some bison are sent to slaughter, and the meat is donated to Indian tribes.

CLOCKWISE FROM LEFT: NATIONAL PARK SERVICE ARCHIVES; MARK MILLER / IMAGES ON THE WILDSIDE; BUFFALO FIELD CAMPAIGN; BUFFALO FIELD CAMPAIGN

**CONCERNED PARTIES** Bison advocates such as the Buffalo Field Campaign and some Indian tribes have long denounced the Park Service policy of hazing and slaughtering bison. In an effort to reconcile concerns by advocates and cattle ranchers, a diverse group representing those and other interests recommended in 2010 allowing some bison to live year round in Montana near the park.

ation in an unfavorable light. A possible solution to the conundrum came in the early 2000s, when scientists learned that bull bison present almost no risk of brucellosis transmission. Suddenly it seemed feasible to consider allowing males outside the park.

Inspired by the new science, in 2010 the Citizens Working Group on Yellowstone Bison, a diverse collection of ranchers, tribal members, and bison advocates, recommended letting bison live year round in areas of Montana next to Yellowstone. IBMP partners agreed to let bulls roam on public land north of the park, from Gardiner Basin as far north as Yankee Jim Canyon, about 11 miles from the boundary. As part of the agreement, fences and cattle guards were installed to prevent the bison from roaming farther north into Paradise Valley, home to several large cattle ranches. New fences in Gardiner would protect trees, backyards, and gardens from the free-roaming animals. Bison ranging outside the new tolerance areas would be hazed back inside or lethally removed.

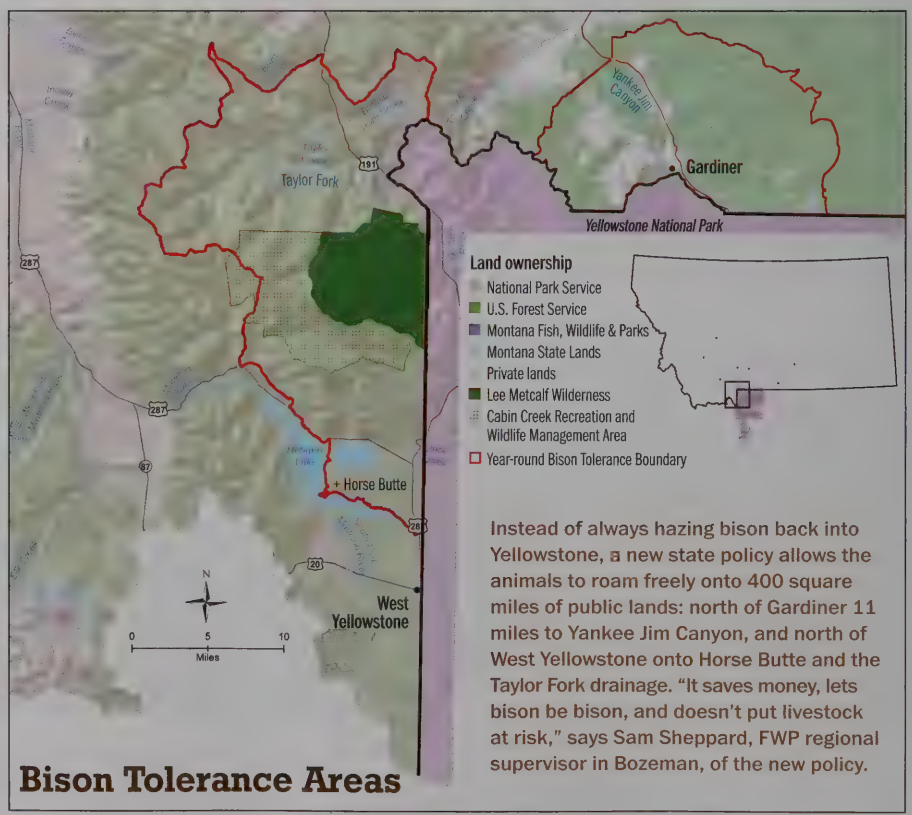
Since 2011, bison leaving the northern park boundary in winter have been, for the most part, left alone. No brucellosis transmission to cattle has occurred.

Heartened by the success of the Gardiner expansion and urged on by the citizen's working group, the IBMP partners next decided to look at allowing bison expansion outside the park's western border. Bison cows were leaving the park's snow-crusted meadows in early spring in search of grass, which they found on the south-facing slopes of Horse Butte in Hebgen basin. "That's really important for them in late winter and early spring, when they're in late pregnancy and carrying calves. They need that extra nutrition," says Rick Wallen, the park's bison ecologist. What's more, cattle no longer grazed on Horse Butte, and few grazing allotments remained in the larger area. Yet at the time, the IBMP still called for hazing bison that crossed the western boundary back into the park by May 15. Was that arbitrary deadline still necessary?

In 2015, after FWP and the Montana Department of Livestock were unable to agree whether hazing needed to continue, Governor Steve Bullock issued a decision to allow bison in a limited area on Yellowstone's west perimeter, including Horse Butte and the Taylor Fork drainage. To allay ranchers' fears that bison would continue expanding west, Bullock ordered that the animals not be allowed beyond prescribed boundaries, varying by season. Culling, hazing, and hunting would still be options to keep the bison within the new expanded range.

### Adjusting to change

In spring of 2016, following Bullock's decision, 300 to 400 bison moved to Horse Butte and public lands to the north and grazed there for a few months before most returned to the park during summer. "The governor's decision saves money by not having to conduct large-scale hazing operations in the Hebgen basin, and lets bison be bison while not putting livestock at risk," says Sam Sheppard, FWP regional supervisor in Bozeman. Bison can now live year round outside the park, north and west, on more than 400 square miles of public land.




Instead of always hazing bison back into Yellowstone, a new state policy allows the animals to roam freely onto 400 square miles of public lands: north of Gardiner 11 miles to Yankee Jim Canyon, and north of West Yellowstone onto Horse Butte and the Taylor Fork drainage. "It saves money, lets bison be bison, and doesn't put livestock at risk," says Sam Sheppard, FWP regional supervisor in Bozeman, of the new policy.

CLOCKWISE FROM TOP LEFT: BUFFALO FIELD CAMPAIGN; BUFFALO FIELD CAMPAIGN; JOHN WARNER

Supporters of the new bison policy include the Greater Yellowstone Coalition. "Bison are wildlife and should be treated as such. I see this decision as a move in that direction," says Shana Dunkley, of the organization's Wildlife Program. McDonald, of the Confederated Salish and Kootenai Tribes, welcomes the governor's decision. "This is restoring our traditional relationship with bison," he says.

Not everyone is on board. Povah, the rancher, opposes the new policy, fearing it will damage the land and vegetation. "When bison come out of the park in early spring, this ground is extremely fragile. If you let bison or cattle trample it, it won't recover in our lifetime," he says.

The governor's decision doesn't end the need for periodic lethal removal to keep Yellowstone bison numbers at a healthy level. In fact, in January 2017, the IBMP partners announced plans to cull the population, which had grown to a near-record level of 5,600 due to mild weather the previous winter, by up to 1,300.

As with building tolerance for population management, increasing the acceptance of bison outside the park will take time. "We need to take an incremental approach to allow people living here to adjust and learn how to live with bison," Dunkley says. Key to building bison tolerance will be for the IBMP partners to continue solving problems such as bison knocking down fences and posing a disease risk. "Most people who love bison don't have to live with them," Povah says.

People will continue to disagree about Yellowstone's bison and the animals' expansion outside park boundaries. Some will demand a return to hazing and greater population reduction, while others will insist on further range expansion and an end to culling. "This issue is far from over," Sheppard says. "But for now, it seems like we've reached a fair and scientifically sound compromise that both the bison and the livestock community can live with."

For their part, the bison at and around Horse Butte appear content just to graze and loaf. They seem oblivious to the cars off in the distance, filled with people yearning to spot wildlife that, if they only knew, can now be seen in some places outside of the park, too.

**ALL QUIET, FOR NOW** Bison dig for grass in Yellowstone National Park. When snow becomes too deep, some temporarily exit the park to find better grazing. FWP and park officials hope new expansion zones north and west of Yellowstone will allow the bison to roam free without putting cattle at risk.

**BRAVE LITTLE BIRDS** Kalispell naturalist and photographer John Ashley shot this sequence of a mother bufflehead peering from her nest in a tree cavity at Rogers Lake; three babies looking down 40 feet below to where she flew; and finally all three taking the plunge themselves.

# Soft Landings

## How can duck and goose hatchlings survive falls of 50 feet or more?

By Barbara Lee

"BOTH PARENTS CALLED FROM BELOW, and one by one the goslings jumped from the nest and fell at least 40 feet, ricocheting off tree limbs on the way down," says Kim Pennington, an administrative assistant at Lee Metcalf National Wildlife Refuge south of Missoula. As six newly hatched Canada geese, perched high in their nest in a dead tree, tuned into calls from their parents to make the leap of a lifetime, Pennington says her hands tightened on the spotting scope.

"I knew they would jump, but I kept asking myself, how can this possibly work? How can they make it? They weren't even 24 hours old, and they dropped from a tall platform nest generally used by ospreys. A couple of the goslings hesitated for a long moment, peering over the edge before tumbling off," she says.

Pennington was describing geese "calling down" their young, a behavior of waterfowl that nest in tree cavities and on cliffs. Calling offspring to the ground is a powerful illustration of the connection between imprinting—a kind of "follow me" programming—and the ability of ducklings and goslings to travel soon after hatching.

Ducks and geese have "precocial young"—able to leave the nest to walk, swim, and forage within hours of breaking free of their shells. "The classic precocial chick is downy, open-eyed, and capable of running about and feeding itself on its first day of life," according to *Current Ornithology* magazine.

By nesting high off the ground, cavity-nesting ducks and geese create safe distance between their eggs and predators. But what happens when the eggs hatch? Imprinting is a dependable way for geese and ducks to quickly gather their hatchlings on the ground, lead them to water and safety, and keep them close at hand.

There are different kinds of imprinting. The most familiar is the line of goslings or ducklings following their waddling mother. This primal bonding occurs with a parent

bird, or even a human, generally within the first hours of a bird's young life. Ornithologists say the process is strongest among cranes, geese, and ducks.

In Montana, six duck species nest in cavities and use imprinting to call their hatchlings to the ground: wood ducks, buffleheads, Barrow's and common goldeneyes, and hooded and common mergansers. John Ashley, a Kalispell naturalist and photographer, captured the moment when a trio of new bufflehead ducklings jumped from the nest to join their mother far below. In a series of three photos (left), Ashley's first image shows the female duck at the tree cavity's entrance. In the second photo, three tiny buffleheads peer down from the nest to where, 40 feet below, Mom has landed on the ground and beckons them to follow. In the third image, the fuzzy siblings are in freefall, their stubby wings, pipe-stem legs, and over-sized webbed feet extended.

"I discovered the nest when I noticed a female bufflehead peering out of a hole in a tree close to one of my favorite trails along Rogers Lake," Ashley says. "Guessing that hatchlings were in the cavity, I raced home to grab my photography gear."

Ashley says he waited three hours while the mother bufflehead poked her head out every five minutes or so. She finally flew down to the base of the tree and, after about ten minutes, emitted just one soft "cluck." The hatchlings appeared at the entrance to the cavity and soon made the heroic jump. They bounced about a foot in the soft grass.

It seems miraculous that every baby bird isn't injured or killed by falling from such heights—or even farther. A 2014 video narrated by BBC filmmaker David Attenborough shows one gosling making a jump that seems impossible to survive. The newly hatched barnacle goose follows its siblings off a cliff nest in Greenland 400 feet above the ground. Its long and harrowing plunge is interrupted at several points by crashes into the cliff wall. Amazingly, the gosling is found by its parents at the end of the fall, alive and intact. (To view the remarkable descent, Google "YouTube goslings cliff.")

Not all young geese and ducks survive the ordeal. In the Attenborough video, the fall kills one of the survivor's siblings. But most come through unscathed. Waterfowl hatchlings are extremely light for their volume: a newly hatched goose weighs only three to four ounces and a duckling even less. These fuzzy puff-balls almost drift down, Ashley says, and they don't accelerate during longer falls as a heavier bird might. In addition, bones of day-old birds are flexible and a little squishy, "like licorice," Pennington says. With luck, the landing is in water, leaves, tall grass, or forest duff. But even when goslings and ducklings strike solid ground, the tiny birds usually amble away unharmed.

It's important that Mom get them down at the same time. After all, she can't waddle off with a few and leave the rest of the crew behind for a few days.

The key to making that happen is for all the eggs to hatch at roughly the same time, so that all the hatchlings are ready to jump together. Jim Hansen, Montana Fish, Wildlife & Parks' Central Flyway coordinator in Billings and the agency's resident waterfowl expert, says the mother visits the nest once each day to lay one egg but doesn't settle down on the clutch until the last egg is laid. This "delayed incubation" ensures that all eggs get an equal duration of her body warmth. "That's the beginning of a synchronized hatch," Hansen says.

Next comes a remarkable form of inter-egg communication. Goslings and ducklings about to hatch begin "pipping"—using their egg tooth on the tip of the bill to break out of the shell. This makes a clicking sound heard by the siblings. Three days before hatching, individuals start pipping at different speeds. Then the group moves toward pipping and chirping at the same rate to synchronize hatching.

Once out of the eggs, the hatchlings generally stay in the nest for 12 to 24 hours, until they are dry, fluffy, and strong. This gives any late hatchers time to catch up. Once on the ground, the imprinting continues as the young birds follow their mother to the safety of a lake, river, or pond.

At the Lee Metcalf NWR, Pennington realized that the Canada goose eggs in the dead tree were close to hatching when the male goose joined the female at the nest. "That was very unusual," she says. "I began checking frequently, and later saw that both parents had moved to the ground beneath the tree." Through her spotting scope, she saw the adults' bills opening and closing as they looked up. It appeared that the geese were calling down their new offspring from the nest above.

"The six goslings made the leap and survived," Pennington says. "Soon after, I saw them in a tight line, following their parents to water. They scurried to keep up, and not one fell out of position. You would have never guessed that, less than 24 hours earlier, they were high up in a tree, encased in shells."

> The puff-balls almost drift down, and have squishy bones as flexible as licorice.

**HERE WE GO** Canada goose hatchlings jump from their nest in a hollowed-out tree. So light are the tiny birds that they bounce slightly after hitting the ground, landing unharmed.

*Writer Barbara Lee lives in Oregon and regularly visits Montana.*

LEFT TO RIGHT: JOHN ASHLEY; RANDY BEACHAM

**UNKNOWN BUT NOT UNIMPORTANT** The rarely seen white-faced ibis wades shallow marshes in parts of Montana. Chronic lack of funding for nongame wildlife conservation limits state biologists' knowledge of the habitat requirements and population status of this and hundreds of other nongame species.

# What about the

## A popular new bipartisan bill working its way through Congress could kick-start Montana into caring for the majority of its wildlife species.

By Tom Dickson

# Others?

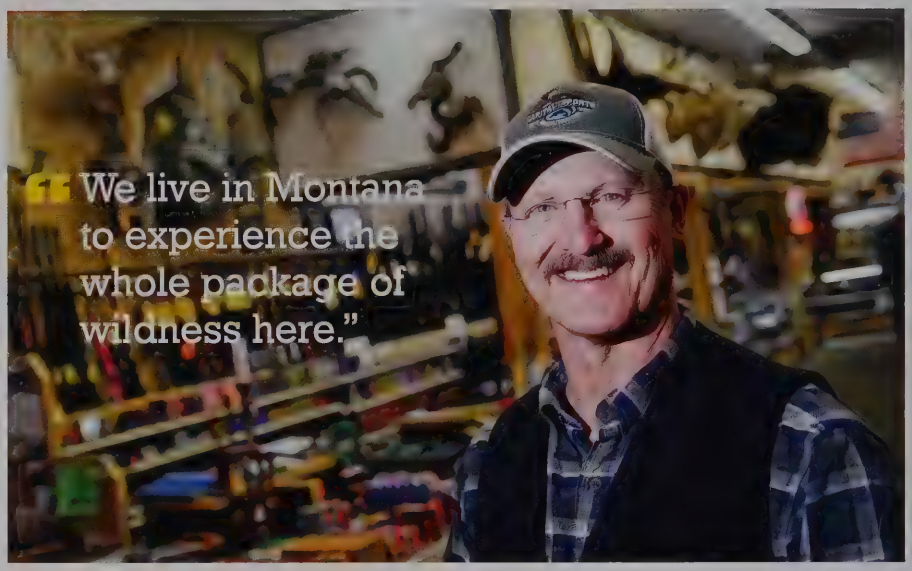
White-faced ibis

PHOTO BY RAY HAMEL

At a glance, Ed Beall doesn't seem like a guy who'd be advocating on behalf of Montana's songbirds, prairie dogs, long-eared owls, and other nongame wildlife. The 57-year-old businessman and devoted elk bowhunter is president of Capital Sports, which does a brisk trade in guns, ammunition, and other hunting gear. Yet Beall cares about all species, not just the trophy elk, mountain goats, and mule deer mounted on the walls of his Helena establishment. "We live in Montana to experience the whole package of wildness here," he says. "That includes the big game animals, sure, but also the songbirds, birds of prey, and all the other wildlife."

People drawn to this region have always appreciated wildlife's diversity. Early Native Americans valued all animals, great and small. Lewis and Clark marveled at every new creature they encountered. In 1928, a contributor to *Montana Wild Life* magazine wrote, "The true sportsman is a keen observer of nature's wonderful creations [and] a sincere advocate for the conservation of nature's useful creations and their welfare."

Now Montanans and visitors are increasingly extolling the virtues of critters that aren't pursued for sport, say Montana Fish, Wildlife & Parks officials. "We're hearing from more and more people who want us to do more for nongame species," says Ken McDonald, head of the agency's Wildlife Division.




**BIG PICTURE BOOSTER** Ed Beall, president of Capital Sports in Helena, believes that Montanans will find a way to fund nongame wildlife management. "I'm convinced most people here recognize that our wildlife is like nowhere else in the country and will want to do something to make sure it's conserved for the future," he says. Beall and other state conservation leaders are now trying to figure out what that "something" might entail.

Appreciating nongame wildlife, however, differs from funding its conservation. "The big question is how would we pay for that additional work when almost all of our budget comes from fees and federal excise taxes paid by hunters," McDonald says. That dilemma has vexed Montana wildlife advocates for years. A recent breakthrough at the federal level provides hope that the vast majority of Montana's wildlife species could soon garner the management attention that ducks, deer, and other game species have received for decades.

**ON THE BACKS OF HUNTERS** Most of the money FWP spends conserving Canada lynx, grizzly bears, and other federally protected species comes from elk and deer hunting license sales. The federal government provides limited funding to states to help manage these species.

### Essential roles

There's no denying nongame wildlife's value. Species like the elegant trumpeter swan inspire awe and wonder. American pikas and black swifts represent wildness. Tiny hummingbirds, flammulated owls, and least weasels are downright adorable. Wildlife delights us, whether it's a busy black-capped chickadee at the feeder or mating sandhill cranes pirouetting in a soggy field. "One year, the highlight of our elk bow hunt in the Breaks was finding a little horned toad," Beall says. "It became our camp mascot."

Because each nongame species plays an essential role in the intricate interactions of all life, like the complex machinery under a car hood, it only makes sense to conserve them all. As conservation guru Aldo Leopold wrote, "To keep every cog and wheel is the first precaution of intelligent tinkering." Clark's nutcrackers spread the seeds of limber pines, essential winter cover for mule deer. Burrowing prairie dogs and ground squirrels mix and aerate soil layers. Some "keystone" species can even signal intact ecosystems. "A healthy grizzly population means a healthy landscape

*Tom Dickson is editor of* Montana Outdoors.

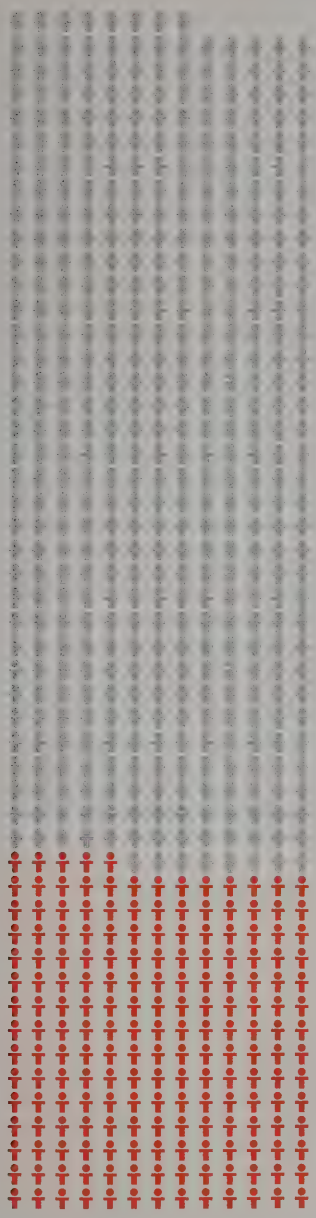
TOP TO BOTTOM: THOM BRIDGE; KERRY T. NICKOU

# The Nongame Funding Dilemma

Almost all of the money that FWP spends annually on managing 80 game fish and wildlife species comes from hunters and anglers—a classic example of "user pays, user benefits." Some big questions facing Montana: 1. How will FWP manage the remaining 85% of fish and wildlife that are nongame species? 2. Who will pay for that work, and how?

## 645,000 Montana Adults

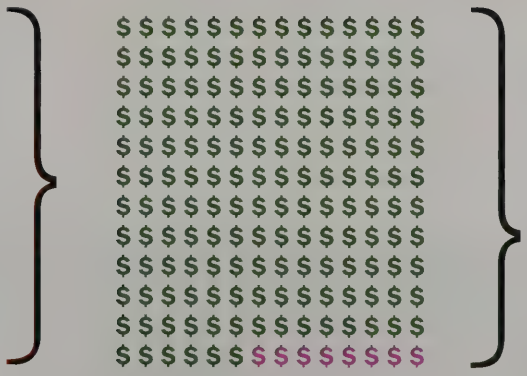
(age 16 and older)



**How might all Montanans pay...**

**...to conserve all of Montana's wildlife?**

## FWP direct annual spending on Fish and Wildlife Conservation



## All 524 Montana Animal Species

(game and nongame)

= 1,000 Montanans

- 71% of Montanans who don't hunt or fish
- 29% of Montanans who hunt, fish, or both

$ = $200,000

- $ 95% of these funds come from license fees and federal taxes on guns, ammo, fishing gear, boats, and boating fuel.
- $ 5% comes from federal grants, hydropower mitigation, nongame tax checkoff, and other sources.

= 1 Montana species

- Montana has about 440 nongame mammal, fish, bird, amphibian, and reptile species.
- Most FWP fish and wildlife funding goes to manage roughly 80 game species.
- Federal law requires Montana to manage an additional 17 species listed as threatened or endangered. Lack of other funding sources means that FWP must use hunter and angler dollars for this costly work.

INFOGRAPHIC BY LUKE DURAN/MONTANA OUTDOORS

that will continue to provide the scenery, the clean water, and the many other natural resources that people value," says Dave Chadwick, executive director of the Montana Wildlife Federation.

Nongame wildlife's greatest importance might simply be that it's been here so long, says Lauri Hanauska-Brown, chief of the FWP Nongame Wildlife Program. Native species have survived in this part of North America for millennia, and some—like the prehistoric pallid sturgeon and shortnose gar—for tens of millions of years. "Most people would consider it shameful for us humans—relative newcomers to this region—to let any species disappear forever," she says.

Broadening the scope of wildlife management was on the minds of Montana legislators in 1973 when they made it clear they wanted to conserve the state's full suite of species. That year the legislature expanded responsibility of the Fish and Game Department, as it was known then, to include not just the roughly 80 game animals but all 524 mammals, fish, birds, amphibians, and reptiles that call Montana home. Unfortunately, in an oversight repeated at the state and federal level for the next four decades, lawmakers offered no new funding to pay for the additional workload.

Wildlife and fisheries biologists already had their hands full managing game species, which make up only 15 percent of Montana's fish and wildlife, along with federally protected species. For "managed" species, biologists track populations, study individual animals, and conserve habitats. That work has proved enormously successful. Elk, deer, trout, wolves, grizzly bears, bald eagles, and more have grown to numbers unimaginable in the early 1970s. Hunting, fishing, and wildlife-watching opportunities abound. Businesses and local economies based on that recreation thrive.

Yet most of Montana's 440-plus nongame species receive scant attention. Many benefit from habitat provided by the state wildlife management areas and coldwater trout rivers protected and improved for game animals. But most are just out there, some doing okay, others struggling, many with fates unknown for lack of basic knowledge about their numbers and whereabouts. "Montana has to take inventory of what it has," says Beall, a member of the Private Land/Public Wildlife Council and several other state conservation committees. "Only after you identify what's out there can you take steps to care for it."

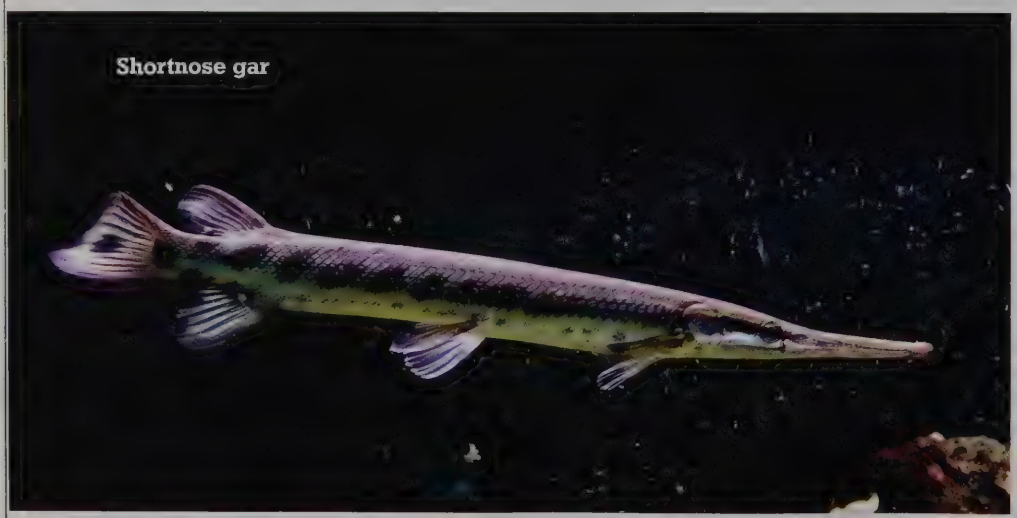
### Compelling need

Monitoring and conserving fish and wildlife can prevent serious problems. For instance, if a species is federally listed, landowners, businesses, and state agencies face burdensome and costly regulations. Hanauska-Brown notes that in recent years the Arctic grayling and sage-grouse were kept off the endangered species list largely thanks to population monitoring, research, and habitat conservation. She points to recent studies on golden eagles that revealed more of the raptors than was previously known and identified flight paths that will help wind developers site turbines that do less harm. "With good information, we can get ahead of problems before they occur," she says.

Another reason FWP feels compelled to conserve additional species: The state's wildlife is held in public trust by all Montanans—not just the 29 percent who fish, hunt, or both. That majority is asking FWP to do more for nongame wildlife. A statewide survey in 2004 found that most residents want the agency to conserve curlews, loons, raptors, songbirds, and other nongame species. That's one reason the department's new ten-year vision calls for the agency to also serve Montanans who care about wildlife but don't care to hunt or fish.

What's more, a growing number of citizens, landowners, and communities want FWP to tackle wildlife problems like overabundant urban deer, raccoons entering attics, and elk, grizzlies, and wolves harming

> "Most people would consider it shameful for us humans—who are relative newcomers to this region—to let any of those species disappear forever."



Shortnose gar

Bohemian waxwing

gardens, crops, or livestock. Tack on to that the ever-increasing calls to FWP to care for wounded raptors and orphaned bears.

As demands for its services grow, FWP can't keep up. Montanans often are surprised to learn that FWP receives almost no state tax dollars for fish and wildlife management. Almost all of that work must be paid for by hunting and angling license fees and longtime federal taxes on shooting, fishing, and boating equipment.

That puts the department in a bind, squeezed between state and federal mandates to manage more species and a limited funding base. "We're really restricted as to what we can do for nongame species, wildlife rehabilitation, and wildlife conflict management," McDonald says.

> "Why aren't other Montanans who care about wildlife paying their share?"

The current funding model also places undue financial pressure on a minority of Montanans. "It's unlikely that hunters and anglers can or will be willing to pay for the growing conservation programs required of FWP, like managing endangered species," says Chris Smith, a former FWP chief of staff who is now the western field representative of the Wildlife Management Institute. "And even if they were, you'd have to question the fairness of that. Why aren't other Montanans who care about wildlife or demand nuisance wildlife removal paying their share?"

One major reason: Unlike the license fees and federal excise taxes that anglers and hunters pay, birders and other wildlife supporters are not licensed or taxed for management and conservation.

**Other states' successes**

Several states have cracked that nut, devising innovative ways to broaden wildlife conservation funding. In 1976, Missouri passed a constitutional amendment dedicating one-eighth of 1 percent of sales tax revenue to wildlife conservation and education. In the 1990s, Arizona, Minnesota, and Colorado created state lotteries to generate wildlife conservation money. A portion of state sales taxes collected on outdoors equipment in Texas and Virginia pays for conservation projects. Florida and South Carolina use real estate transfer taxes to help fund wildlife management.

Inspired by its northern neighbor, Arkansas passed an amendment similar to Missouri's in 1996. "Arkansas did something really smart," says Chadwick, who formerly

LEFT TO RIGHT: SOLOMON DAVID; JAMES RIDLE

## Nongame Timeline

Significant state and federal efforts to manage and create funding sources for nongame wildlife:

Federal action  Montana effort

### 1937

**Pittman-Robertson Act** approves the use of federal excise taxes on firearms and ammunition to fund wildlife conservation. Though some nongame species benefit from habitat protected and improved using P-R funds, most of the money goes to support game species.

### 1965

**Land & Water Conservation Fund** is established by Congress to use federal funds to provide quality outdoor recreation and conserve the land and water that support those opportunities. Money goes to parks, pools, ball fields, fishing access sites, and natural areas for wildlife. Nongame species benefit somewhat.

### 1973

**Endangered Species Act** requires states to develop plans and pay for recovering listed species. Currently Montana has 17 species listed as federally threatened or endangered. Little funding is provided to states for this important work.

On December 28, 1973, President Richard Nixon signs the Endangered Species Act into law.

### 1973

**Nongame checkoff** is established on Montana state tax forms so people can donate to nongame wildlife management. Donations over the next four decades average just $35,000 per year.

### 1980

**Forsythe-Chafee Act** is passed by Congress to promote the conservation of nongame fish and wildlife, but it is never funded.

### 1997

**Conservation and Reinvestment Act (CARA I)** would tax outdoors gear so the millions of recreationists who don't hunt or fish can contribute to wildlife conservation and management. The bill has strong public and industry support but not enough to pass.

## 1998

**Conservation and Reinvestment Act (CARA II)** is a new bill—this one proposing to use federal oil and gas lease royalties rather than an excise tax—with even greater industry and bipartisan support than CARA I. Yet it fails at the last second due to cold feet by some in Congress.

## 2001

**State Wildlife Grants (SWG) Program** is created by Congress to help states carry out comprehensive wildlife programs that address at-risk species. The idea is to prevent species from becoming federally endangered and saddling states, industry, and landowners with regulations. To ensure the money (from federal oil and gas leases) is spent effectively, SWG requires each state to develop a comprehensive assessment of fish and wildlife and habitats. Funding for states has declined over the years—in Montana from $1.3 million in 2002 to $750,000 in 2015. Yet SWG still represents a significant increase in nongame wildlife conservation revenue.

## 2005

As required under SWG, Montana completes its **Comprehensive Fish and Wildlife Conservation Strategy,** identifying the state's critical fish and wildlife species and habitats.

## 2014

FWP forms a **Finding Common Ground** committee of citizens to explore funding options for nongame wildlife management.

## 2015

By 2015, FWP has established a **nongame wildlife specialist** in each of its seven regions across the state. Funding comes primarily from hunter and angler licenses and federal taxes on shooting, boating, and fishing equipment.

## 2016

**Blue Ribbon Panel on Sustaining Diverse Fish and Wildlife** is convened in 2014 by Bass Pro Shops founder John Morris and former Wyoming governor Dave Freudenthal. The goal: find a way to fund the conservation of at-risk non-game species and habitats. In 2016, the panel recommends that Congress dedicate $1.3 billion from leases on oil and gas wells on federal lands and waters for broad-based conservation by each state. Many in Congress support the idea, but as this issue goes to press a bill has yet to pass in the House or Senate.

worked for the Association of Fish & Wildlife Agencies studying nongame funding efforts. "The Arkansas Game and Fish Commission went to the public and asked, 'What do you want your fish and wildlife agency to do? What needs aren't being met?' Then the commission told the agency to figure out what all that would cost."

With a price tag and a public mandate for action, Arkansas conservation leaders and a bipartisan legislative committee successfully lobbied for new funding. "If you want to better connect people with the purposes of their fish and wildlife agency and their taxes, you need to tell them specifically what you intend to do with their money and how that work has value," Chadwick says.

Montana could also learn something from Oregon, says Smith. Recently, a broad-based, bipartisan commission appointed by Oregon's governor looked at the Department of Fish and Wildlife's broad responsibilities, including managing more of the state's wildlife species and serving a broader base of citizens. The commission also surveyed Oregonians to learn what they wanted from the department. The commission then asked what it would cost to fulfill those responsibilities, then identified two options to fill the gap: a small surcharge on the state income tax, or a tax of 10 to 20 cents on a six-pack of soda or beer.

> "Nationally, for every game species that's thriving, hundreds of nongame species are in decline."

Montana lacks a sales tax, and its roughly $13 million per year in state lottery proceeds goes to the state general fund. Paying for

# Playing for free

Most of the fastest-growing outdoor activities in Montana—wildlife watching, kayaking, mountain biking, and hiking—require no licenses or fees. And unlike hunting and fishing equipment, the gear people use for these activities generates no funding for managing public lands and waters. Yet outdoor recreationists expect maintained river access sites and forest trails, clean water, and abundant wildlife. Unlike hunters and anglers, who pay for their recreation, these other users play for free. For decades, state and federal conservation leaders have tried without success to devise an outdoor recreation fee or license, similar to those required for hunting and fishing. They have also explored creating a federal excise tax on outdoor equipment that would help fund the management of outdoor recreation.

### Federal Excise Taxes on Outdoor Equipment

Revenue used to manage fish, wildlife, land, water, and recreation

| | |
|---|---|
| Guns and ammo | 11% tax |
| Bows and arrows | 11% tax |
| Fishing gear | 10% tax |
| Boat fuel | 10% tax |
| Mountain bikes | 0% tax |
| Camping gear | 0% tax |
| Kayaks, binoculars | 0% tax |
| Bird seed | 0% tax |

CLOCKWISE FROM LEFT: SHUTTERSTOCK; DIANA LEVASSEUR; JOHN CARUSO; ERIC ENGBRETSON; NATHAN COOPER

Sora

Yellow-bellied marmot

Greater short-horned lizard

Iowa darter

Northern redbelly dace

American pika

Mountain plover

Long-toed salamander

broader wildlife conservation will require an entirely new revenue source. Montanans have done that before, creating a motel and resort "bed tax" that pays for the state's tourism promotions. New nongame funding would require similar innovation.

**Blue Ribbon Panel**

The most promising nongame wildlife funding news for Montana and other states comes from Washington, D.C. In 2014, Bass Pro Shops founder John Morris and former Wyoming governor Dave Freudenthal asked other business and conservation leaders to convene what they called the Blue Ribbon Panel on Sustaining America's Diverse Fish and Wildlife Resources. The group's charge: find a new way to fund the conservation of all fish and wildlife. "There is a fish and wildlife crisis," states the panel's final report. "For every game species that is thriving, hundreds of nongame species are in decline."

That could spell economic trouble for states if declines lead to federal endangered species listing. Nongame wildlife loss also means revenue loss for retailers and communities that rely on campers, birders, and other recreationists to buy products and fuel local tourism economies. "We need to start down a new path where we invest proactively in conservation rather than reactively," the report concludes.

> "When you consider Montana's success and national leadership in conserving game species, it's surprising we've fallen so far behind other states in conserving our at-risk nongame species."

In spring of 2016, after looking at dozens of funding options that would support conservation of at-risk species and habitats, the panel recommended Congress dedicate $1.3 billion from leases on oil and gas wells on federal lands and waters. The proposal would put existing federal revenue—no new fees or taxes would be imposed—into the Wildlife Conservation and Restoration Program (WCRP). The WCRP has been on the books since 2000 but has never been funded.

Last summer, Alaskan Republican Congressman Don Young and Michigan Democratic Congresswoman Debbie Dingell introduced the Recovering America's Wildlife Act, which closely reflects the blue ribbon panel's recommendations. The bill attracted 20 cosponsors, Republicans and Democrats, from around the country. "That kind of bipartisan support is unheard of for a billion-dollar appropriations bill in an election year," says Chadwick. Congress adjourned at the end of 2016 without taking action on the bill, but sponsors plan on reintroducing it early in the new Congress. An effort to introduce a companion bill in the Senate is also under way, Chadwick says.

In the 2000s, a federal conservation program known as State Wildlife Grants (SWG) began giving limited oil and gas royalty revenue to states. To receive its share, every state had to develop a comprehensive conservation strategy that identifies and ranks at-risk species and habitats. If the Recovering America's Wildlife Act passes, the money would be apportioned to states based on population and landmass for conserving species and habitats identified in those plans. Montana's share: roughly $22 million a year.

There's just one catch. As with Pittman-Robertson money, the new bill would require a 3-to-1 state match. To receive the $22 million, Montana would need to come up with $7 million on its own. But from where?

Nationwide more than 6,000 groups teamed up to support the SWG effort in the early 2000s. Led nationally by the National Wildlife Federation, that coalition is now pushing for Congress to pass the Recovering America's Wildlife Act. Here at home, the Montana Wildlife Federation is building a coalition of groups—from the Rocky Mountain Elk Foundation to local Audubon chapters—to support nongame management funding in Montana.

"When you look at all the benefits that would come with it, there's no question Montana needs broad-based fish and wildlife conservation," Chadwick says. "And soon there could be this huge opportunity staring us in the face with the federal bill. All Montana has to do is come up with a way to fund its share."

Other states have done it. Conservation leaders are confident Montana can, too. Says Chadwick: "When you consider this state's success and national leadership in conserving game species—elk, pronghorn, trout, bighorn sheep—it's surprising we've fallen so far behind other states in doing the same for our at-risk nongame species."

## 5 reasons to conserve Montana's nongame wildlife

1. **Preserve their beauty, grace, and ability to inspire wonder**
2. **Maintain their ecological value**
   (all species are essential cogs in the great machinery of nature)
3. **Recognize their intrinsic value**
   (because they've been here for thousands of years)
4. **Protect their value to humans**
   (bats eat pesky mosquitoes, and snakes kill nuisance mice and rodents)
5. **Prevent costly endangered species listing**
   (species allowed to reach near-extinction will be federally listed, causing hardship to private landowners and state and local governments)

CLOCKWISE FROM LEFT: BILL MCDAVID; KATE & ADAM RICE; SHUTTERSTOCK; ERIC HEIDLE; DONALD M. JONES

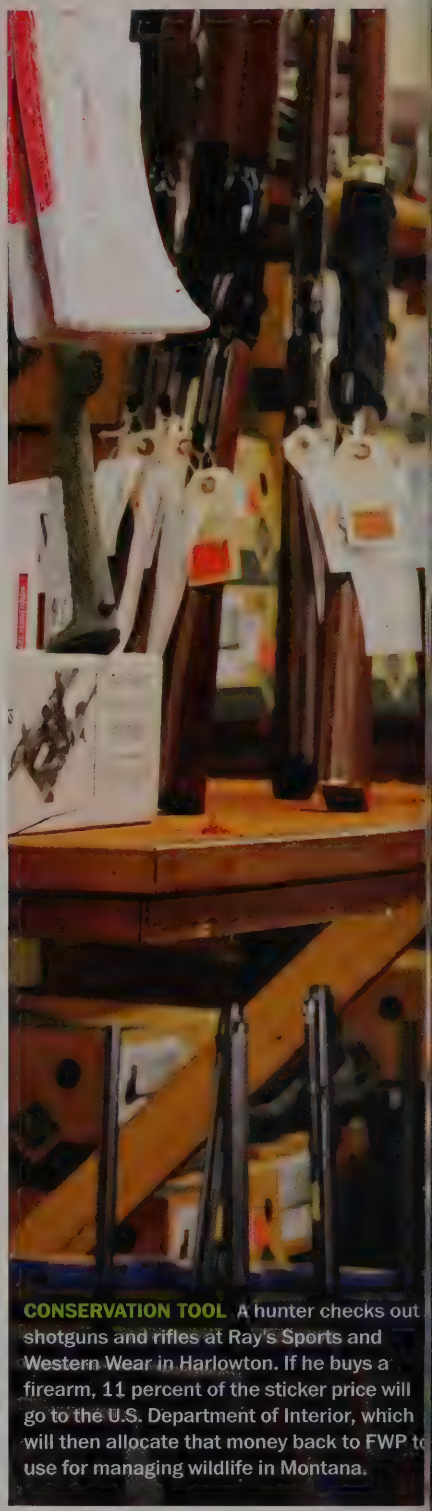
# MY FAVORITE TAX

For decades, we hunters, shooters, and archers have been paying a federal surcharge that helps conserve elk, bighorn sheep, geese, grouse, and other wildlife. If you didn't know that, you're not alone. BY HAL HERRING

As we gnash our teeth and rail at the assaults on our natural world—from calls to sell off federal lands to oil spills fouling our drinking and fishing waters—we conservation-minded Montanans need to take a few long moments to unclench our jaws and celebrate our successes. One in particular is largely unknown to the ranks of new hunters—the men and women who want to harvest naturally organic meat for their families. I enthusiastically welcome these newcomers. I want them, and the rest of us, to truly understand how we produced the wildlife populations they are just now beginning to enjoy and the rest of us have been appreciating most of our lives.

I want to tell them about the Pittman-Robertson Act (also known as P-R), and the cash that for decades has been flowing from it into our state's wildlife management coffers. As hunter license sales level off and non-hunting-related demands on Montana Fish, Wildlife & Parks continue to increase—grizzly bear management alone costs the agency $650,000 per year—P-R has never seemed so important, or so visionary.

I thought most people in the hunting world knew about P-R, but I was wrong. While researching this article, I called the gun counter at a major outdoor retailer to ask if the Pittman-Robertson taxes applied to cartridge reloading equipment (I later learned they don't). The friendly guy who answered the phone—otherwise knowledgeable about his merchandise—told me he had never heard of the Pittman-Robertson Act. I don't fault him for not knowing. We shooters and hunters have done a poor job of explaining, even to one another, just how irreplaceable P-R and hunters are to American wildlife and habitat conservation and management. So, for the good guy at the gun counter and everybody else, including me, here's the story of the most important single source of funding for wildlife the world has ever known.



**CONSERVATION TOOL** A hunter checks out shotguns and rifles at Ray's Sports and Western Wear in Harlowton. If he buys a firearm, 11 percent of the sticker price will go to the U.S. Department of Interior, which will then allocate that money back to FWP to use for managing wildlife in Montana.

DEBORAH BIERL

## Taxing ourselves

The Federal Aid in Wildlife Restoration Act of 1937, called the Pittman-Robertson Act after its sponsors (Senator Key Pittman of Nevada and Representative A. Willis Robertson of Virginia) came about at the lowest point for wildlife populations in our nation's history. The Depression and Dust Bowl had taken a toll. State and federal agencies charged with restoring populations were broke. Worried about this dire situation, sportsmen across the country pressured Congress to continue an existing excise tax on firearms and ammunition. Congress agreed and set the tax at 11 percent. President Franklin D. Roosevelt signed the act into law.

The tax money collected from the manufacturers (who pass the extra cost on to

*Hal Herring is* Field & Stream*'s conservation blog editor, a professional pine cone harvester, and author of* Famous Firearms of the Old West. *He lives in Augusta.*

customers in the retail price) goes to the U.S. Department of the Interior. That revenue is then returned to each state according to a formula based on the number of hunting licenses sold each year and total landmass. (As the fourth-largest state in the nation, Montana makes out well in this regard. According to Adam Brooks, FWP's Federal Aid Program manager, Montana gets back $1.24 for every $1 in P-R excise tax that Montana sportsmen and sportswomen pay.)

Foreseeing that state legislatures might be tempted to use the money for other purposes, Congress required that P-R funds be used only to maintain wildlife populations, provide public access, and otherwise support programs that directly benefit hunters and shooting sports. To ensure that states continued to okay hunting license fee increases and not rely solely on the federal funds, Congress had another great idea: Before a state could receive its share of P-R money, it had to pony up at least 25 percent in matching funds from hunting-license dollars. That helps sportsmen's groups push for regular license fee increases that at least keep pace with inflation. A state unable to match its allocated funds must return the P-R money back to the Department of the Interior to distribute to other states that can.

P-R is a classic case of "user pays, user benefits." If hunters want to hunt, they have a responsibility to fund the management and conservation of wildlife.

The results of this visionary conservation legislation have been extraordinary, for both hunting and nonhunting fans of wildlife. In Montana alone, P-R has contributed more than $275 million over the past 79 years for wildlife habitat and management, benefiting creatures from warblers to whitetails. Some of the money is targeted for hunting education programs, but most pays for the work of wildlife biologists, including the semiannual flyovers to count big game across Montana. It also goes to buy and manage Beckman, Mount Haggin, Dome Mountain, Blackfoot-Clearwater, and other state wildlife management areas and conservation easements.

Success of the Pittman-Robertson Act led to its expansion in 1970 to include a 10 percent tax on handguns and 11 percent tax on archery equipment.

P-R money, generated by everything from the youth-sized compound bow you bought your *Hunger Games*–inspired daughter to the box of all-copper .270 cartridges purchased by your eco-minded brother-in-law, continues to be the backbone of FWP wildlife management.

**TAX RETURNS** The price sticker on ammo includes an 11 percent federal surcharge allocated to states for wildlife conservation.

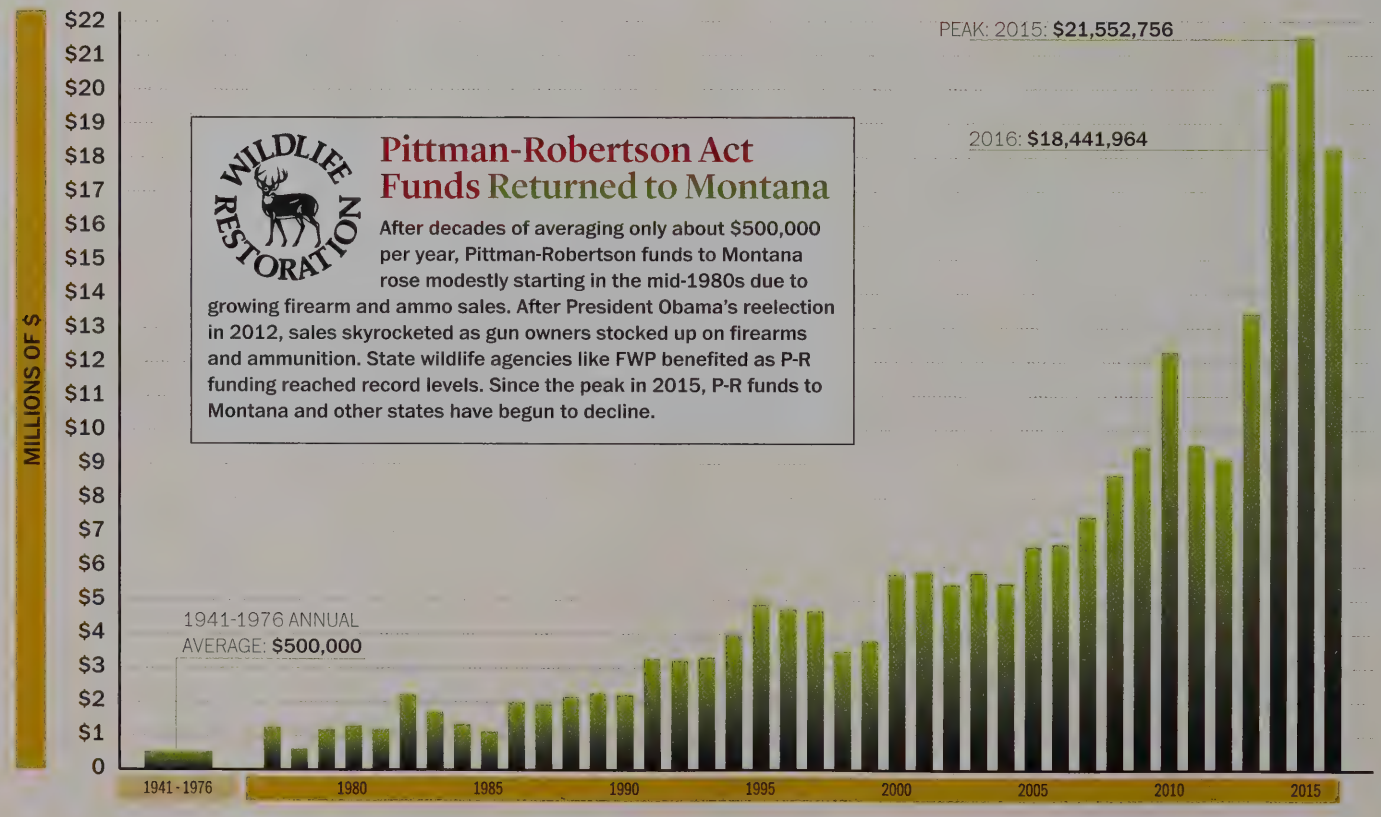
**We'd need all the support we could get to help us fight—and I know this sounds odd—to keep taxing ourselves for the good of wildlife conservation.**

## Huge return on investment

These visionary excise taxes are based on basic principles of economic growth: Restore wildlife habitat to increase numbers of huntable game animals and boost the sale of licenses, which in turn fuels the sale of more guns, bows, and ammunition, which then provides more excise tax revenue for restoring wildlife. The cycle continues on in beautiful perpetual motion, teeming with happy outdoorsmen and outdoorswomen, healthy big game herds, and skies alive with pintails, tundra swans, and snow geese.

Of course hunters, shooters, and gun and ammo manufacturers don't tax themselves out of the goodness of their heart. There's huge self-interest in maintaining huntable wildlife populations and building markets for bows, rifles, and bullets.

But there's also no denying the enormous societal benefits accrued by the P-R excise tax. Most everyone enjoys seeing the elk,



bighorn sheep, deer, black bears, and other big game restored and managed with the surcharge. P-R money protecting a marsh helps a watchable green heron just as much as it does a huntable green-headed mallard—not to mention maintaining a wetland's many ecological benefits: absorbing spring floods, filtering water, and storing carbon-laden soil and vegetation.

Then there's the extraordinary return on investment. One nationwide study in 2011 found that the federal excise tax represented a 1,000 percent return on investment to manufacturers. Billions of dollars are spent not only by hunters and anglers but also by wildlife watchers, hikers, and other nonhunters who enjoy the clean water, abundant wildlife, and open spaces that P-R funds pay to conserve and protect.

It is unfortunate that so few people know this story. But it's important that all of us who care about wildlife do. Too many people just assume we have open space and wildlife and clean water by divine right. It's like how kids living at home with good parents believe there will always be a sound roof over their heads and plenty of food on the table, never seeing the toil and risk it takes to earn those essentials. Abundant wildlife and healthy habitat don't just happen. Certainly nonhunters contribute by donating to groups like The Nature Conservancy and paying federal taxes for managing national forests. But the lion's share of wildlife habitat and management funding comes from hunting licenses and P-R funds. It's up to those of us who fork over that money each year to explain those great benefits to one another and our fellow citizens.

Nearly a century ago, American leaders recognized the nation's responsibility to restore and steward its greatest natural resources—and had the genius to figure out how to pay for it. It was hunters who made this happen, and we're still doing it. But that's not enough.

It's essential that we also tell everyone who cares about wildlife about that ongoing accomplishment. Someday Congress might try to repeal the Pittman-Robertson Act, and we hunters would need all the support we could get to help us—and I know this sounds odd—keep taxing ourselves for the good of wildlife conservation.

## Anglers, boaters also tax themselves

Inspired by the success of the Pittman-Robertson Act, Congress in 1950 passed the Federal Aid in Sport Fish Restoration Act (known as the Dingell-Johnson Act, or D-J), creating a 10 percent tax on boats, boating fuel, and fishing tackle. This has become another of the planet's great conservation success stories. In 2016, Montana Fish, Wildlife & Parks received $8.7 million from D-J and used it for everything from maintaining fishing access sites to running hatcheries to monitoring fish populations.

Side note: Representative John Dingell of Michigan, who co-sponsored the bill, was the longest serving member of Congress in history when he retired in 2014. Dingell consistently received an "A" rating from both the National Rifle Association and a 100 percent rating from the League of Conservation Voters. I find that combination a powerful antidote to cynicism.

*—Hal Herring*

Still no tax on bird seed

## A near miss for P-R-style nongame funding

Nongame wildlife conservation almost had its own Pittman-Robertson–type dedicated funding source. In the early 1990s, the Association of Fish & Wildlife Agencies launched an initiative to expand hunting, fishing, and boating excise taxes to include a 1 to 5 percent surcharge on backpacks, sleeping bags, tents, canoes, bird seed, binoculars, and other camping, recreation, and birding gear. The idea was that all outdoors enthusiasts would benefit from the clean water, open space, and abundant nongame wildlife the new funding would conserve.

Supporting the proposal were the National Wildlife Federation, the National Audubon Society, The Nature Conservancy, key members of Congress, and many manufacturers and retailers.

Unfortunately, a trade group representing several large outdoors recreation companies opposed the idea, as did members of Congress who had pledged to add no new federal taxes. By the late 1990s, the new surcharge idea was shelved.

In its place came proposals over the next two decades to fund broad-based fish and wildlife conservation using royalties from oil and gas development on federal lands and waters. Though more than 6,000 organizations representing millions of birders, hikers, hunters, anglers, and other outdoors enthusiasts now support dedicated federal funding for fish and wildlife conservation, Congress has made only halting progress.

A current proposal by the Blue Ribbon Panel on Sustaining America's Diverse Fish and Wildlife Resources has found bipartisan support in both houses. It holds the greatest promise ever for providing a permanent funding source for this much-needed conservation work.

*—Tom Dickson*

LEFT TO RIGHT: LUKE DURAN; RAPALA; SHUTTERSTOCK

# MUSSEL LOSS

## What can we do about the western pearlshell's steady decline?

BY PAUL J. DRISCOLL

While surveying fish populations on an upper reach of Browns Gulch Creek, a tributary of Silver Bow Creek northwest of Butte, Fish, Wildlife & Parks fisheries biologist Jason Lindstrom and his crew began noticing iridescent blue shells on several sand bars. Lindstrom thought that seemed odd, because it wasn't a stream known to contain native freshwater mussels. Then he looked down into the stream substrate and was surprised to see living specimens of the rare western pearlshell mussel.

"What was so strange was that we'd always thought of the western pearlshell as living mainly in clear, cold streams," Lindstrom says of his 2007 discovery.

That's certainly not Browns Gulch Creek. The Montana Department of Environmental Quality (DEQ) ranks the stream as one of the basin's most degraded tributaries due to sedimentation (which suffocates trout eggs and underwater insects) caused by erosion, land cultivation, and roadwork in the surrounding watershed. What's more, nonnative brook trout have replaced native westslope cutthroat, a species that pearlshells historically used as part of their reproduction process.

Yet for some reason, Browns Gulch contains western pearlshell mussels. The Montana Natural Heritage Program (MNHP) found large numbers of both adult and juvenile mussels, indicating a healthy population, in 2009 and 2014.

**MUSSEL MAN** Ecologist Dave Stagliano transfers adult pearlshell mussels into Monture Creek in the Blackfoot Valley. Reintroductions could help offset the chronic loss of these native species throughout their range.

The Browns Gulch Creek discovery is the only good news for the western pearlshell in recent years. Elsewhere populations have tanked, causing biologists to worry about the species' long-term prospects. (Meanwhile, biologists have sounded alarms about infestations of non-native invasive zebra and quagga mussels, which threaten to damage Montana aquatic ecosystems as well as irrigation pipes, hydropower facilities, and boating equipment.)

In 2014, while working for MNHP, aquatic ecologist Dave Stagliano found no living western pearlshells during his 2014 survey of central Montana's Smith River and its tributaries. "Things look pretty grim for pearlshells there and in other parts of the eastern Missouri drainage," he says. Montana retains only about 20 quality western pearlshell mussel populations out of roughly 200 known historical locations.

**STREAM "KIDNEYS"** A single western pearlshell mussel can filter [illegible] gallons of water per day. Healthy mussel populations can keep streams clean while converting bacteria and bits of detritus into [illegible] that feeds aquatic insects.

The loss of western pearlshells means more than a native species gone forever, as tragic as that would be. The mussels filter stream water, making it cleaner. "Think of them as a stream's kidneys," says Stagliano. "Losing them is like losing your kidneys." Pearlshells also serve as indicator species. "If they are disappearing, that means you've got

CLOCKWISE FROM TOP: MINSTAN CREEK/MONTANA FWP; ROGER TABOR (USFWS)

water quality problems, and it's only a matter of time before you also start losing aquatic insects and native trout," he says.

### IRIDESCENT SHELL LINING

Freshwater mussels are among Montana's strangest creatures. Three to four inches long, the underwater animals are bivalves, possessing two opposing shells hinged by tough, fibrous ligaments. Though lacking eyes, they possess sense organs that allow them to negotiate their underwater environment. Using its inhalant siphon, a mussel draws in water over its gills. The gills absorb oxygen and filter out the protozoa, bacteria, and bits of detritus that the mussel consumes. The filtered water is then pumped out via the exhalant siphon.

The western pearlshell is the most common mussel in the Pacific Northwest, ranging from Alaska and British Columbia south to California and east to Wyoming and Montana. In Montana, the western pearlshell is the only native mussel west of the Continental Divide. Historically, it also lived east of the Divide in water that contained westslope

> "If these mussels are disappearing, that means water quality problems, and it's only a matter of time before you start losing native trout."

"Pearlshell" refers to the iridescent blend of minerals secreted by this species and some other mussels on the inside of the shell, called nacre and commonly known as mother-of-pearl.

cutthroat trout. (Central and eastern Montana are also home to the native fatmucket and giant floater mussels.)

"Pearlshell" refers to the iridescent blend of minerals secreted on the inside of the shell, called nacre and commonly known as mother-of-pearl. The calcium carbonate material is the same substance that makes a pearl, created when an oyster or mussel secretes minerals to cover a grain of sand or other irritant that gets between its shells. Occasionally a western pearlshell mussel produces a small, misshapen pearl, but for the most part it's the shell lining that has ornamental value.

Aboriginal peoples probably used the shells of western pearlshell mussels for decorative purposes and as tools like hide scrapers.

*Natural history writer Paul J. Driscoll is an information officer with the Montana Department of Environmental Quality. He has previously written articles for* Montana Outdoors *on axolotls and locusts.*

In 1900, University of Montana biologist Morton Elrod reported finding spent pearlshells in large piles—known as middens—along the Clark Fork and Bitterroot Rivers. A 3,000- to 5,000-year-old archaeological site near today's Three Forks of the Missouri also indicates the historical presence of pearlshell mussels. Biologists use these archaeological finds to map where the native species historically occurred.

Though saltwater mussels are widely eaten worldwide, the flesh of the pearlshell and other freshwater mussels is tough, rubbery, and muddy tasting. Wildlife is not so picky. River otters, raccoons, and muskrats sometimes find a bed of mussels and carry the aquatic animals to the banks, where they force open the shells and eat the fleshy interiors. The remains of such a feast is likely what Lindstrom found along the sand bars of Browns Gulch Creek.

### WATER PURIFIERS

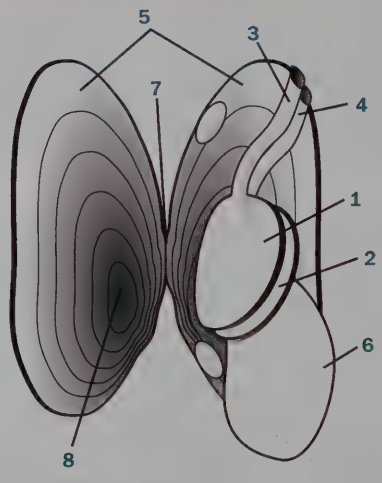
Western pearlshells congregate where currents, structure, and depth provide ideal conditions for long-term survival. The best habitats are in deep pools or runs where the mussels can remain under several feet of water even during low summer flows. Gravel beds sheltered from heavy spring flows by upstream boulders also provide prime habitat.

Adults and young mussels slowly move a few inches at a time via a single "foot" (actually an organ), allowing them to adjust position to reach better underwater feeding lanes. For the most part, mussels are sedentary, rarely traveling more than a few feet within a gravel bed where they spend their entire lives. In winter, the mussels work their way down into the gravel and become semidormant until water temperatures rise in spring.

Mussels purify water. A single mussel filters up to a gallon per hour during the summer. "When multiplied by thousands or tens of thousands of mussels in a stream, all that filtration helps keep water clean," Stagliano says. Also, the protein-packed "pseudo-feces" the mussel emits enriches the surrounding streambed and feeds salmonflies, stoneflies, caddis flies, and other aquatic insects.

Freshwater mussels require fish hosts for reproduction and distribution. In Montana's

## Western pearlshell mussel anatomy (interior)




1. Frontal gill
2. Back gill
3. Exhalant siphon
4. Inhalant siphon
5. Shell halves
6. "Foot"
7. Hingeline and ligament
8. The shell's thickest part, the umbo

LEFT TO RIGHT: TOM GRACE/JAXSHELLS.ORG; WIKIPEDIA.ORG; JEREMIE HOLLMAN

> A fully mature pearlshell mussel alive today conceivably could have dropped off a cutthroat trout's gills during Theodore Roosevelt's presidency.

part of the northern Rockies, the western pearlshell evolved alongside native west-slope cutthroat trout. Elsewhere in the Northwest, steelhead, rainbow trout, and salmon help distribute the species. Each spring, when water temperature and flow reach just the right level, male mussels release sperm though their exhalant siphon. The sperm washes over nearby females, which take it up through their inhalant siphon to fertilize eggs held in their gills. Later, the females release millions of the fertilized eggs, called glochidia. Newborn trout fry gobble up the eggs as they float past. Once inside the fry, glochidia attach to the gills and become enclosed in cysts. For the next one to three months, they harmlessly live off the fry. The tiny mussels then fall from the fish and settle to the stream bottom, usually in a new stretch of stream. If the habitat is healthy, young mussels can burrow into the gravel and survive—often for decades.

In fact, the western pearlshell is one of Montana's longest-lived species, on average surviving 50 to 70 years. Some scientists think specimens can live for more than 100 years. That means a fully mature pearlshell mussel alive today conceivably could have dropped off a cutthroat trout's gills during Theodore Roosevelt's presidency.

## POLLUTED TO DEATH

That western pearlshells live a long time does not mean the species is resilient. Just the opposite. Like other long-lived species, such as Montana's white and pallid sturgeons, mussels grow and develop slowly. It may take them a decade or more to reach sexual maturity. As with sturgeons, a mussel that dies during its first several years of life never has a chance to reproduce and replace itself in the population. Compare that to fast-maturing species like cottontails, which rarely live more than one year but can produce four litters of young during that time.

What causes western pearlshell populations to decline? Stagliano says it's the combination of sediment (from streambed alterations and cattle trampling the banks) and excess nutrients (from overfertilized crops or leaky septic systems). Even more harmful is low water. "When stream stretches dry up, the mussels are exposed and die," he says.

Stagliano has seen population declines firsthand. While working for the Montana Natural Heritage Program in 2003 and 2004, he conducted benchmark surveys of western pearlshells on streams and rivers throughout Montana. In follow-up surveys for FWP on the same waters a decade later, he found that western pearlshells were fast disappearing.

Some biologists suspect the loss of west-slope cutthroat trout in those streams—caused be the same factors harming mussels—may be contributing to the pearlshell's decline. Stagliano concurs, but notes that non-native brook trout and rainbows, which have replaced cutthroats in many streams, may sometimes serve as adequate substitutes.

That may be one reason pearlshell mussels have survived in Browns Gulch Creek. "Brook trout may not be the ideal species, but apparently they are working out for the mussels," Stagliano says. Another reason could be that parts of the stream are not as degraded as previously thought. "Maybe the section where they are persisting is in better shape than downstream, which really is in rough shape," he says.

One way of helping stem the pearlshell's decline is to reintroduce mussel colonies into streams where the species historically lived. Several efforts in Washington State have appeared to work. FWP and the U.S. Fish & Wildlife Service hired Stagliano to try similar reintroductions in Montana. Unfortunately, only one Montana reintroduction, into Monture Creek near Ovando, has shown even modest results.

Conservation agencies now hope to boost success by introducing cutthroat fry carrying mussel glochidia instead of planting adult pearlshells. Stagliano says plans are under way for scientists to closely observe adult mussels in a laboratory setting to learn more about the timing and water temperatures needed for successful reproduction. Once female pearlshells in aquariums are ready to release their glochidia, genetically pure cutthroat fry will be added to feed on the fertilized eggs. Then the tiny fish will be released into suitable streams.

Though reintroductions could help offset some loss of western pearlshells throughout the species' range, they cannot reverse the mussels' widespread decline. Streams and rivers throughout western Montana where pearlshells were once abundant now hold none of the mussels. That signifies more than a little-known animal's demise. It also means that Montana's cold, clean, abundant water that supported the species for hundreds of thousands of years is likely disappearing, too.

# Securing Homes for Montana's Wildlife

## For 30 years, Habitat Montana has conserved living spaces for game, nongame, and endangered species. Will it survive?

By Greg Lemon

With its abundant game, vast tracts of public land, and a sparse human population, Montana is a hunting and wildlife-watching paradise. But it wasn't always so.

As in much of the West, Montana's wildlife was nearly wiped out in the late 19th century. Market and subsistence hunters killed tens of thousands of elk, bison, and deer to feed the miners, loggers, and settlers pouring into the territory. One photo from the 1909 Montana Fish & Game Commission's Biennial Report (below right) shows two hunters at their camp near Boulder with 22 dead deer. Butcher shops in Butte, Missoula, and Great Falls regularly stocked fresh carcasses of bighorn sheep, pronghorn, and elk, along with ducks and geese harvested with nets. Big game that avoided the onslaught faced fierce competition from vast herds of cattle and sheep.

The decline was rapid, tragic, and nearly absolute. Bison that once covered the plains dropped to fewer than 1,000 by 1890, and the species suddenly faced extinction. In the early 1920s, state officials estimated that only 3,000 pronghorn and 3,500 elk remained in the entire state. Deer were so scarce that residents called local newspapers to report a sighting. Trumpeter swans and Canada geese all but disappeared.

How did wildlife rebound so remarkably that Montana is now home to record numbers of elk, a state where deer and geese are so common as to be nuisances in some places, and pronghorn herds hardly garner a glance from passing motorists?

Most of the credit goes to science-based hunting seasons and limits that regulate harvest, along with game law enforcement and big game reintroductions. But sustaining that recovery in later years required restoring the places where wildlife live. Starting in the 1940s, FWP, hunters, and landowners began working together to secure essential habitat to conserve big game and waterfowl species, provide public hunting access, and reduce depredation problems on private land.

In recent years, that work has been funded by an essential program called Habitat Montana. How the program came about, and what it has accomplished, exemplify Montana's commitment to wildlife. "In my 30-year career, I've seen very few states with the foresight to create a fund like Habitat Montana, one that is paid for strictly

**NO LIMIT** To feed hungry pioneers, miners, loggers, and others pouring into Montana Territory, unregulated commercial hunters decimated big game populations in the late 19th century.

*Greg Lemon is the Information Bureau chief for Montana Fish, Wildlife & Parks.*

**PLACES TO LIVE** Big game populations recovered thanks to regulated harvest and reintroduction efforts. But starting in the mid-20th century, biologists saw that fast-disappearing habitat was thwarting full recovery. With support from hunters and landowners, FWP began securing prime wildlife habitat such as the Sun River Wildlife Management Area, which provides essential winter range for elk moving down from the high country.

through license sales," says Mike Mueller, Land Program manager with the Rocky Mountain Elk Foundation (RMEF), in Missoula. "There isn't much other money out there to conserve prime wildlife habitat and public access."

## RESTORATION BEGINS

Montana began protecting wildlife habitat in 1940 in the Judith River Basin between Lewistown and Great Falls. Years earlier, in 1915 and 1917, ranchers concerned by low elk numbers in the Little Belt Mountains led an effort to transplant Yellowstone National Park elk into the area. They and their predecessors had been drawn to the Little Belt foothills by the region's lush grass, but the cattle operations and overhunting had decimated the resident elk herd. The citizen-led elk reintroduction effort was almost too successful. By 1938 elk were so plentiful they competed with cattle for winter range on private land.

In 1940, using hunting license fees and funds from a new federal excise tax on sporting equipment, the Montana Fish and Game Department, as it was then called, bought 237 acres of prime winter range where elk could come down from the Little Belts to feed without encroaching on adjacent ranches. The parcel was the heart of what would become the 9,400-acre Judith River Wildlife Management Area. The purchase was the first in Montana made with hunter dollars, in the spirit of neighborliness with area ranchers, to benefit wildlife and public access. Today the Judith WMA continues to provide critical winter range for elk and deer herds, diverse hunting opportunities, and grazing for cattle from a neighboring ranch.

> "In my 30-year career, I've seen very few states with the foresight to create a fund like Habitat Montana."

For the next half century, similar habitat projects in Montana happened in fits and starts. Wildlife managers and sportsmen's groups cobbled together money for a parcel of wetland habitat here or a chunk of winter range there. But FWP lacked a dedicated

PHOTOS: MONTANA FWP

**LITTLE BELT ELK PARADISE** Montana's successful tradition of acquiring wildlife habitat began on the Judith River WMA. Over the past 30 years, Habitat Montana has helped improve and maintain this and other state wildlife lands with fencing, signs, weed control, and habitat enhancements.

source of funding for habitat. That was about to change.

## BUYING EASEMENTS AND PROPERTY

In 1987 the Montana Legislature passed House Bill 526, creating the Habitat Montana Program. It set aside money from the sale of big game hunting licenses for the purpose of conserving "important [wildlife] habitat that is seriously threatened." Habitat Montana initially accumulated $2.8 million annually, more than 90 percent from nonresident license sales. By 2015, the program was receiving roughly $4 million per year.

To use the funding wisely, FWP identified the most important and imperiled habitat types in Montana, such as wetlands and intermountain grasslands. One potent tool for protecting those habitats was acquiring conservation easements. Easements are voluntary legal agreements between a landowner and FWP. An easement restricts certain development on the property, such as subdividing parcels, plowing native grasslands, or leasing land for hunting, and requires some form of public hunting. In return, the landowner receives a one-time payment of roughly 40 percent of the property's value. That money allows ranchers to stay on their land and improve the ranch operation. For instance, after Donna and Les Hirsch sold FWP a conservation easement along ten miles of the wildlife-rich Tongue River near Miles City, the couple used some of the proceeds to purchase additional ranchland.

Habitat Montana helped FWP acquire, from F.H. Stoltze Land & Lumber, the recent Trumbull Creek Conservation Easement near Whitefish—7,068 acres of wildlife habitat, public hiking and snowmobile trails, and mountain streams that otherwise could have been sold for subdivisions. "This is definitely a win-win arrangement," says Chuck Roady, the company's vice president and general manager. "The easement lets us continue to sustainably manage the forest and allow public recreation while at the same time protecting it from development."

FWP also uses Habitat Montana to make fee-title purchases from willing sellers to create new wildlife management areas (WMAs) or add to existing areas. Examples include adding 650 acres of wildlife-rich wetlands to Ninepipe WMA north of Missoula, doubling the size of Dome Mountain WMA in the Yellowstone Valley, and purchasing Marshall Creek WMA in the Seeley-Swan Valley.

To ensure public representation, these and other large acquisition projects must be approved by the Fish and Wildlife Commission and the State Land Board.

So that FWP can maintain and improve WMAs, Habitat Montana provides critical funding—about $800,000 per year—for that work. As a good neighbor to adjacent landowners, FWP controls spotted knapweed and other invasive plants, builds boundary fences, posts signs, and maintains

LEFT TO RIGHT: CHRIS MCCOWAN; JOHN WARNER

roads and other infrastructure with this money. The program also pays for crews to enhance and restore wildlife habitat with vegetation plantings, irrigation, and even cooperative grazing agreements involving FWP and neighboring landowners.

Nongame and endangered species benefit, too. For instance, the 24,000-acre Marshall Creek WMA contains prime whitetail habitat and is also home to federally protected grizzly bears, bull trout, and Canada lynx.

## TURNING $1 INTO $4

Savvy FWP wildlife managers leverage Habitat Montana funds to secure millions of additional dollars for wildlife habitat. Many federal habitat programs must be matched by nonfederal funds. The Forest Legacy Program, for instance, provides $3 for every $1 FWP makes available. "Without Habitat Montana, we'd have to seek special funding from the legislature for that match each time a priority habitat project became available," says Ken McDonald, head of FWP's Wildlife Division. "Most likely, we'd lose our opportunity to secure that habitat because of the time it would take to request and have the necessary funds appropriated."

Until recently, FWP could decide whether to purchase conservation easements—there are currently 63, totaling 440,000 acres—or make fee-title purchases. "Sometimes it makes more sense to buy the land outright, because then we can do prescribed burns, selective logging, tree plantings, and other management work that can really benefit wildlife," says McDonald. "But other times we get a lot more bang for the buck with easements. Ultimately, we do what's best for habitat, because that's what the legislation stipulates."

> "That's the beauty of Habitat Montana. Each landowner is different. Each parcel of ground is different."

Two years ago, FWP lost its ability to make fee-title acquisitions. The 2015 Montana Legislature scrutinized fee-title purchases that used Habitat Montana funds. Some lawmakers wanted the department to retain its acquisition option because the price of key properties in Montana, especially critical habitats along rivers, was skyrocketing. Others argued that FWP owned enough property and should maintain and manage the lands it already had. In the end, the legislature revoked the agency's authority to use Habitat Montana funds for fee-title purchase. FWP acquisition projects already under way could move forward, but new fee-title projects were disallowed.

Mueller says the restriction has hampered RMEF's ability to help FWP conserve elk habitat. Opportunities to work with landowners who want to conserve their property or improve public access are fleeting. Success depends on the organization's ability to move quickly and secure funding, such as from Habitat Montana, to complete projects, he says.

According to McDonald, FWP wildlife managers have had to turn down several landowner offers to sell prime wildlife habitat and hunting lands to the department. "We can still use Habitat Montana for conservation easements, and we're pursuing those, but some landowners want to sell outright," he says. "Because of the fee-title restriction, we can no longer offer that option."

## PROVIDING OPTIONS

Landowners who want to stay on their land, conserve its wildlife values, or both, want options. Those who prefer a conservation easement that doesn't require public access can sell to a nonprofit land trust. For those who don't mind allowing public access, selling FWP a conservation easement funded by Habitat Montana is another option. Still others may want to sell their land to the department to enhance public access and protect and improve the habitat they've worked hard to manage.

"Habitat Montana is based on voluntary decisions by landowners," says Glenn Marx, executive director of the Montana Association of Land Trusts. "That's the beauty of the program. Each landowner is different. Each parcel of ground is different. Habitat Montana is one more option for landowners to consider when evaluating different ways of conserving their land."

Over the past 30 years, Habitat Montana has proved successful, generating praise from landowners and conservation groups alike. "If it weren't for this program, we couldn't have done anywhere near the number of acquisitions and easements in Montana that we've done over the past 30 years," Mueller says. If the program were to ever disappear, he adds, "we'd lose a very effective tool to conserve the best of Montana's elk country and add essential new public access."

**HABITAT HERO** Cattle rancher Henry Gordon of Chinook on the 15,000-acre Blaine County conservation easement that FWP purchased using Habitat Montana funds. "I thought it was a good way to save our prairie grass," he says. "It's worked out well."

# Seeing the sights

by Bruce Auchly

After all the slicing and dicing and studying of wildlife, along comes an animal or two that defies expectations, showing us we really don't know it all.

Recently two cow moose, radio-collared on the Rocky Mountain Front as part of a ten-year population study, displayed a wanderlust that confounded Nick DeCesare, research wildlife biologist with Montana Fish, Wildlife & Parks.

"We've seen local migrations, but nothing like these two," DeCesare says.

One cow moose took off during the summer of 2015 from the Pine Butte Swamp west of Choteau and strolled to Fresno Reservoir, west of Havre. That's a straight-line distance of about 110 miles—even longer "as the moose walks." By fall of 2015, the five-year-old animal had returned to Pine Butte Swamp and has not left since.

Then, last summer, a different cow moose—age three—took off west from the Rocky Mountain Front. She crossed the Continental Divide, walked through the Bob Marshall Wilderness, and ended up on the Clark Fork River near Anaconda.

Later that fall, she headed back east, crossing the Divide near Roger's Pass, spent time in front yards around Fairfield, then headed north past Choteau. DeCesare says she is still on the move and is now in southeastern Alberta, having traveled 400 miles so far.

AAA couldn't have come up with a more scenic trip. "Most moose don't move around a lot," DeCesare says. "In fact, many spend the entire year in an area covering only a few square miles."

DeCesare notes that bachelor males occasionally take some very long hikes. For instance, every few years a moose or two shows up in Iowa, having strayed several hundred miles south from northern Minnesota or even Canada. One made it as far south as Texas. "But to see that kind of movement with a cow moose is far less common," he says.

Of the 105 moose radio-collared in DeCesare's study, only the two cows have ranged widely.

DeCesare looks at what drives moose populations in three areas of the state: the Cabinet Mountains, the Big Hole, and the Rocky Mountain Front.

Lots of problems in the moose population have claimed lots of headlines recently. "In other parts of the world, moose face challenges of predation, lack of nutrition, parasites and diseases, and climate effects," DeCesare says.

Though FWP has conducted some local studies on Montana's moose population—in the Yaak Valley in the 1980s and in the Ruby Range and Tobacco Root Mountains during the 1960s and '70s—the department has never before taken a comprehensive look at the state's population.

Now four years into his study, DeCesare can say that each of the three research populations is different, for different reasons.

Adult female survival in the Cabinet population is strong, but the percentage of calves surviving one year, called recruitment, is below average. Predation may play a role. Overall, that population is steady.

Cow moose survival in the Big Hole is down, possibly from parasites and disease, but recruitment is good.

"The Front is one of the few places in the state with a growing population," DeCesare says. "That population has really high productivity, survival of adult cows, and recruitment."

Maybe that's it. Maybe the neighborhood just got too crowded for the two females, and they started looking for new addresses, perhaps a fixer-upper.

"Just when you think you've seen it all," DeCesare says.

ILLUSTRATION BY E.R. JENNE

*Bruce Auchly manages the FWP Regional Information and Education Program in Great Falls. Ed Jenne is an illustrator in Missoula.*

# Richardson's ground squirrel

*Urocitellus richardsonii* **By Dennis C. Joyes**

One of the best places in Montana to see wildlife is around a colony of ground squirrels. Colonies are clusters of burrows used by a dozen of more of the rodents, commonly called "gophers." At a gopher colony, you stand a good chance of seeing burrowing owls, bull snakes, raptors, badgers, and sometimes a fox. And of course there are the ground squirrels themselves—sitting upright on their haunches looking for enemies, or scurrying back and forth between burrow openings and feeding areas.

**Scientific name**

***Urocitellus*** is from the Latin *uro*, meaning "tail" and *citellus*, meaning "ground squirrel." The species name ***richardsonii*** honors Sir John Richardson, a Scottish naturalist and explorer who first collected the species for science in Saskatchewan in the early19th century.

### Appearance

The Richardson's ground squirrel is one of six ground squirrel species in Montana. The others are the Uinta, Wyoming, Columbian, golden-mantled, and thirteen-lined. It's tough to tell some of the species apart. Generally, if you are east of the Continental Divide and north of I-90, odds are that it's a Richardson's.

Richardson's ground squirrels are small, stout-bodied animals with short ears, large black eyes, and a relatively short, nonbushy tail. The fur is short, dense, and yellowish-beige—perfect camouflage in the dry prairies where these rodents live. The eye ring and sides of the head and neck are light buff, while the upper surface of the tail is black and edged with buff or tan. Adults are about a foot long, including the three-inch tail. Fully grown, they weigh about three-quarters of a pound.

### Behavior

Ground squirrels couldn't survive long without their burrows. The rodents sleep, hibernate, raise their young, and escape predators and bad weather in these underground chambers and connecting passageways. Burrows are often clustered in loose colonies and dug in what appears to be impossibly hard soil. From their entrances, about 3.5 inches wide in a conspicuous mound of dirt, burrows extend three to six feet underground, and may run horizontally 50 feet or more.

Richardson's ground squirrels spend most of the year—eight months or more—hibernating underground. Males are the first to emerge in spring, followed by females and their young. They return to hibernation in the same order, adult males first, as early as late June, then females, and then, in late summer and fall, juveniles. Gophers have several different calls, but the most frequently heard is a long whistle, which warns of a ground predator, or a short chirp when sighting a hawk or eagle.

*Writer Dennis C. Joyes lives in Ontario and often returns to Montana, his home state.*

### Range

The Richardson's is the most northerly of the ground-dwelling squirrel species. They range over eastern and central Montana, the Dakotas, and the Canadian prairies.

### Food

Ninety percent of the species' diet consists of the leaves, flowers, and seeds of grasses and forbs such as blue grama, milkvetch, and pigweed. They also eat introduced plants such as bromegrass, crested wheatgrass, clover, and, much to the annoyance of farmers and ranchers, seeds and seedlings of wheat, oats, and barley. Ground squirrels that live near croplands are typically bigger and produce larger litters than those residing on native prairie.

JUDY WANTULOK

### Habitat

Richardson's ground squirrels prefer heavily grazed, short-grass prairies. When prairies are plowed and planted with grain or alfalfa, these rodents quickly adapt, frequently establishing colonies around field edges.

### Reproduction

Females mate within a few days of emerging from hibernation, in March or April, depending on temperature. Five to eight blind, hairless young are born following a roughly three-week gestation period. The young emerge from their burrows within a month, usually in late May or June. Females begin breeding at age one and produce a single litter each year. While young males disperse to new areas, mothers and daughters establish lifelong bonds and defend their home territories against males and unrelated females.

### Conservation Status

Many predators eat Richardson's ground squirrels and help keep populations in check. Broad-winged hawks alone may take 15 percent of a population each season. Other predators include badgers, long-tailed weasels, bull snakes, coyotes, foxes, and domestic dogs and cats. Many ground squirrels are also killed on roads by vehicles. Despite such ever-present mortality, the species remains abundant throughout its range.

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## PARTING SHOT

**THANKFUL FOR HABITAT** Elk, deer, and other big game have more prime living areas across the state thanks to the Habitat Montana Program. See page 36 to learn more about this successful habitat funding source, created by the Montana Legislature in 1987 and still going strong. Photo by Randy Smith.

Montana Fish, Wildlife & Parks

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